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EDITORIAL ANNOUNCEMENTS.

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CONTRIBUTIONS.—Subscribers and others will materially assist in making our news accurate and complete if they will send early information of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

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CONTENTS

VOL. XLI., No. 26. FRIDAY, DECEMBER 28, 1906.

CAR AND LOCOMOTIVE OUTPUT IN 1906.

The car famine of the last two months has not been caused by lack of effort on the part of the railroads to obtain new equipment, for the returns from the car and locomotive builders in the United States, Canada and Mexico give an output far in excess of any previous year. The railroads began giving large orders for equipment fifteen months ago, and the record-breaking output of last year was largely due to the greatly increased production during the last three months of the year. The demand eased off late last spring, chiefly because of high prices and the fact that all the works were booked to their full capacity for six or eight months ahead, making it impossible to give deliveries for immediate needs. Since the end of the summer, however, it has increased again, and orders are being given for delivery nine months or a year hence. Official returns from the 38 car building companies on the North American continent (estimating two small plants not heard from) give the total number of railroad cars built during 1906 as 243,670. This includes subway and elevated cars, but does not include electric street and interurban cars. In addition to this total, the railroads have built in their own shops a large number of cars, both freight and passenger, but no estimate has been made of these. Of the manufacturers' output, 240,503 cars were for freight service, and 3,167 for passenger service; 236,451 were for domestic use, and 7,219 for export. This is an increase of 45 per cent. over the record-breaking output of 1905, and of 259 per cent. over the output of 1904. Canada built 7,059 freight cars and 83 passenger cars, and Mexico built 203 freight and 6 passenger cars. The increase in the Canadian output over last year is 230 per cent. All of the builders have shared alike in the tremendous increase. A number of the companies reported this year the number of unfilled orders on their books. Most of them have more cars on order than they have built during the entire year with their plants working at their maximum capacity. This is the best indication of the enormous demand for rolling stock and the utter inability of the railroads to get the cars they need. The following table shows the *Railroad Gazette's* compilation of the number of cars built during the last eight years; totals for 1905 and 1906, including Canada:

Year.	Freight.	Passenger.	Total.
1899	119,886	1,305	121,191
1900	115,631	1,636	117,267
1901	136,950	2,055	139,005
1902	162,599	1,948	164,547
1903	153,195	2,007	155,202
1904	60,806	2,144	62,950
1905	165,455	2,551	168,006
1906	240,503	3,167	243,670

The locomotive output is quite as phenomenal. The 12 builders in the United States and Canada turned out 6,952 locomotives during the year, of which 6,232 were for domestic use and 720 for export. This is an increase of 27.3 per cent. over last year's total of 5,491. These figures do not include locomotives built in railroad shops, or locomotives rebuilt or repaired. There were built 237 electric locomotives and 292 compounds, as against 140 and 177, respectively, last year. The Canadian output was 217. The following table shows the number of locomotives built during the last 15 years; totals for 1905 and 1906, including Canada:

1892	2,012	1897	1,251	1902	4,070
1893	2,011	1898	1,875	1903	5,152
1894	695	1899	2,473	1904	3,441
1895	1,101	1900	3,153	1905	5,491
1896	1,175	1901	3,384	1906	6,952

The cost of cars and locomotives has increased considerably during the year. Estimating the average cost of freight cars at $1,050, the total spent for freight cars amounts to $252,525,000. For passenger cars at $8,000, the cost was $25,336,000, and for locomotives at $14,500, the cost was $101,384,000. The total amount spent by the railroads for new rolling stock and motive power thus approximates $380,000,000, an increase over last year of about 45 per cent.

RAILROAD BUILT IN 1906.

Official returns from most of the railroad companies in the country, supplemented by our own records and figures furnished by the State Railroad Commissions, show that approximately 5,623 miles of new railroad line have been built in the United States during the calendar year 1906. These figures include 57 miles of new main track relocated, but do not include second, third or fourth track, sidings or electric lines. The total is 28 per cent. more than was built in 1905. This large increase reflects, in part, the preliminary work carried out last year, when active construction was resumed, following the retrenchment policy generally observed in 1904. It also shows the new movement toward the Pacific coast, and the noteworthy prosperity of the present year. A number of lines which had completed grading in 1905, but were unable to get rails, have done their track laying this year, but the mileage thus accounted for is offset by the fact that several large projects which it was expected would be well advanced were prevented from adding any considerable amount of new mileage in 1906, owing to the continued scarcity of material and labor. The scarcity and high price of labor has become a serious problem to builders, especially on the Western lines, where agriculture, mining and the trades offer unusual inducements,

and at San Francisco extraordinary wages are being paid skilled and unskilled labor, attracting forces away from the Western Pacific and all new railroad work in that territory. Track has been laid on the Chicago, Milwaukee & St. Paul's Pacific extension for only about 39 miles, leaving almost the entire line to be finished; the Western Pacific has laid 113 miles of its line from Salt Lake City to San Francisco, which is to be 840 miles long (exclusive of branches), and over 1,000 miles remain to be built on the Kansas City, Mexico & Orient. In Canada, the Canadian Pacific is building nearly 1,000 miles, while the Canadian Northern and Grand Trunk Pacific plan to build a large number of branch lines in addition to work now under way. In Mexico, the Southern Pacific has large plans for new lines to develop the west coast, but the filing of survey maps with the Mexican Government is not yet finished, and construction work has hardly been begun.

New main track mileage is reported in 44 states and territories, including Alaska, where 15½ miles of new track were built. Texas leads the list, with track laid on 635 miles, an increase of 297 miles over 1905, largely due to the building of branch lines to keep pace with the agricultural development of the state, and to the new lines of the Colorado & Southern, and the cut-off of the Houston & Texas Central on its Fort Worth-Houston line.

South Dakota, which built 116 miles last year, is second this year, with 388 miles. Louisiana is third, with 334 miles, and Nevada is fourth, with 282 miles. The largest decrease reported is in North Dakota, where only 247 miles were built, as compared with 520 miles in 1905. Illinois and Oklahoma Territory also each show at least 100 miles less than last year. The largest decrease in 1905 was in Missouri, where 270 miles were built in 1904, only 49 miles in 1905, and 30 in 1906. In addition to the four states already mentioned which lead the list, Arkansas, North Dakota, Florida and Wyoming each built over 200 miles, while Idaho, Georgia, Nebraska, Mississippi, Utah, New Mexico, Wisconsin, California, Minnesota, Virginia, Illinois, Pennsylvania, Colorado, Washington and Indiana, in descending order, built over 100 miles of main line in 1906. No new mileage was reported in Connecticut, Delaware, Iowa, Maryland, New Hampshire, Rhode Island or Vermont.

The number of miles built in Canada was 1,007, a decrease of 174 miles as compared with 1905, when 1,181 miles were built. Last year the large increase was due principally to the extensive building of the Canadian Northern, 600 miles, and the Canadian Pacific, 277 miles. These two lines added largely to their mileage in 1906, but do not monopolize the showing as they did in 1905. In 1906 the Canadian Northern built 183 miles and the Canadian Pacific 268. On the new transcontinental line of the Grand Trunk Pacific, track laying will be started early in 1907 on the section from Winnipeg west to Edmonton, 790 miles, where most of the grade is ready for the rails.

Mexico shows an increase of 58 miles, or about 24 per cent.; the mileage built amounting to 296 miles, as against 238 in 1905.

The following table shows our figures for mileage built in the United States during the last fourteen years:

1893.....3,024	1898.....3,265	1903.....5,652
1894.....1,760	1899.....4,569	1904.....3,832
1895.....1,428	1900.....4,894	1905.....4,388
1896.....1,692	1901.....5,368	1906.....5,623
1897.....2,109	1902.....6,026	

RECEIVERSHIPS AND FORECLOSURE SALES IN 1906.

The mileage of roads that went into the hands of receivers during 1906 is small, as would be expected during a period of such widespread prosperity; in fact, the figure is, with the exception of 1901, the smallest since 1881. The results are really about the same as in 1905, although the mileage of bankrupt roads then was tremendously increased by the Cincinnati, Hamilton & Dayton and Pere Marquette troubles, which, of course, were the results of gross manipulation of the credit of the companies rather than of their unsuccessful operation. During the year six roads went into receivers' hands; the first of these, the Toledo Railway & Terminal, as a direct result of the Cincinnati, Hamilton & Dayton receivership. The $3,500,000 4½ per cent. bonds of this company were guaranteed by the C., H. & D. and the Pere Marquette jointly. The January 1, 1906, interest was defaulted and Judson Harmon, Receiver of the other two roads, was appointed Receiver two days later. The Chicago Terminal Transfer company has been in trouble since 1904, when the Lake Shore, the Rock Island and the New York, Chicago & St. Louis moved into the La Salle street station and terminated their contracts with it for use of the Grand Central station. Interest has been in default since 1905. It is believed that J. J. Hill has already or will ultimately acquire control of the company and the high market price of its bonds argues some favorable outcome from its present troubles. The other companies are comparatively unimportant. The Velasco, Brazos & Northern went into the hands of a receiver in February, and was sold in July to satisfy a judgment of $236,000. The Peoria & Pekin Terminal is operated by both steam and electricity. It has two lines of road between Peoria, Ill., and Pekin, and has trackage rights over five miles of street railway in Peoria. When the receiver was appointed it was alleged that the company had $150,000 floating debt. The Peoria Railway Terminal Company was recently incorporated to take over the Peoria & Pekin Terminal as soon as the affairs of the old road are wound up, which it is expected will soon be done. The Union & Glenn Springs is a Virginia road, owned by a cotton company. The New Jersey & Pennsylvania runs from Whitehouse, N. J., to Morristown.

Receiverships.

Name.	Mileage.	Bonds.	Stock.	Date of receivership.
Toledo Railway & Terminal.....	31	$3,825,000	$3,100,000	Jan. 3.
Velasco, Brazos & Northern*....	20	200,000†	200,000†	Feb. 2.
Union & Glenn Springs	22	.....	50,000	.....
New Jersey & Pennsylvania.....	27	1,000,000‡	145,000	Mar. 1.
Chicago Terminal Transfer.....	84	15,140,000	30,000,000	Apr. 16.
Peoria & Pekin Terminal	21	977,000	600,000	Oct. 27.
Total	204	$21,142,000	$34,095,000	

*Sold under foreclosure, July 3.
†Authorized.
‡Authorized, but not issued. $20,000 bonds of subsidiary outstanding.

With the exception of the largest road in the list, the more important foreclosures during the year were merely the necessary formalities of finally taking over smaller roads by stronger systems. The St. Louis & North Arkansas, the largest in the list, was never in the hands of a receiver. The semi-annual interest was defaulted in July, 1905, and January, 1906, and then the bonds were deposited with a reorganization committee. This committee, consisting of D. R. Francis and others, bought in the road a few months later, and reorganized the company as the Missouri & North Arkansas. The Nashua, Acton & Boston had been operated by the Boston & Maine for some time, and has now been bought by a subsidiary of the Boston & Maine, the Concord & Montreal. The Dillsburg & Mechanicsburg, a Pennsylvania road, has been operated by the Cumberland Valley since 1873, the last named company owning all the bonds. It was bought by the Cumberland Valley. The Maricopa & Phoenix & Salt River Valley was bid in by the Southern Pacific, which owned the stock and most of the bonds. The Michigan, Midland & Canada has been operated by the Michigan Central, and was sold to New York Central interests to satisfy a judgment of $921,000.

Foreclosures.

Name.	Mileage.	Bonds.	Stock.	Date of sale.	Selling price.
St. Louis & North Arkansas.	128	$3,065,500	$1,702,500	May 29.	$2,000,000
Brooklyn & Rockaway Beach	3	338,000	150,000	May 2.	400,000
Berkeley Railroad	10	6,000*	115,000	July 23.	10,000
Nashua, Acton & Boston...	20	500,000	500,000	Mar. 7.	320,000
Dillsburg & Mechanicsburg	10	100,000	89,800	Feb. 3.	50,000
Sioux City, Homer & Southn	6	200,000	500,000	Sept. 26.	16,700
Velasco, Brazos & Northern.	20	200,000	200,000	July 3.	80,000
Michigan Midland & Canada	15	323,635	300,000	Feb. 23.	.....
Maricopa & Phoenix & Salt River Valley	42	618,000	1,000,000	Oct. 15.	778,750
Total	254	$5,345,135	$4,442,300		

*Floating debt.

A CAR DIVERSION PENALTY.

At last one of the worst phases of the car-interchange evil—wrongful diversion of borrowed cars—is to be attacked directly, and we shall see whether the evil is too big to attack or too small to catch; whether traffic men will be able to show that it cannot be corrected without destroying good business or the operating men will say that diversions are so elusive and the diverters so sly that it is impossible to run down and bring to the light each important case.

A half a dozen prominent roads have agreed that from the beginning of the present month and until July 1, next, they will pay each other $5 each for every car wrongfully diverted. Now there will be something doing besides discussing averages and swapping glittering generalities. Five dollar bills are not likely to be paid out for either the use or misuse of freight cars without some pretty definite knowledge of the actual reasons for and against the

payment in each individual case. The roads in the agreement are the Erie, the Pennsylvania (both east and west lines) and the Baltimore & Ohio; the Chicago, Milwaukee & St. Paul and the Kansas City Southern; and the Union Pacific and its allied lines (the Harriman system). The Diversion Agreement was formulated by the Car Hire Committee, of the Car Hire Agreement, which is a supplement to the Per Diem Rules Agreement, which rules were formulated by the Car Service Committee of the American Railway Association. (To trace this list clear back to the "house that Jack built" would take too much space—we have enumerated the titles thus far in order that the reader may have some idea of the status of the Diversion Agreement). Only roads owning 1,000 or more freight cars have been invited to join this agreement, and we understand that probably no more will be taken in. Obviously there will be a great amount of correspondence in settling the cases which will come up in the first month or two, and it would be easy to overload the clerical machine at the outset so that it would quickly be clogged by internal friction. The definition of diversion, as formulated in the agreement, is as follows:

Foreign cars must be returned promptly to their owners as follows:

1. Loaded to or via the home road.
   If such load is not available, cars of immediate connections must be delivered to the home road; cars of other roads must either be loaded to an immediate connection of the car owner or be delivered to the home route.
2. Delivered empty to a connection for loading to the home road or home route, to be returned within four days. Such deliveries shall be indicated on the junction report by the words "For home loading."
3. Forwarded to a foreign road when received consigned to that road.
   Any other delivery to a foreign road will be a diversion for which a diversion penalty of $5.00 must be paid to the owner of the car.
   If the enforcement of these rules shall result in a considerable empty mileage without compensating loaded mileage, the case shall be adjusted on the basis of 3 cents per empty car-mile, to be paid by the roads responsible.

All disputes arising under this agreement shall be settled by the Car Hire Committee.

This agreement is to terminate on July 1, 1907, unless it shall be extended, modified or dissolved, by the vote of the majority of the signers thereto, owning two-thirds of the cars represented, such action to be taken at a meeting of said signers, called by the Car-Hire Committee on ten days' previous notice. In case the agreement is extended, subscribers may withdraw by giving three months' previous notice in writing to the Secretary of the Car Hire Committee.

Mr. Hale, chairman of the Car Hire Committee, thus becomes, it will be seen, the chairman of the arbitration committee of the Diversion Agreement. Fortunately the duties of the arbitration committee under the Per Diem Agreement of 1902 now take up much less time than formerly, so that Mr. Hale and his committee will, no doubt, be able to attend to the calls on them; though the work will by no means be an easy one. Mr. Hale has had to open an office in New York City (at the headquarters of the American Railway Association) and another officer has been appointed to relieve him of some of his work on his own road. One of his first duties will be to get a bigger letter head, to hold the names of all his employers, some of whom are named above. In spite of this multiplicity of titles, however, there is no danger that his physical (or mental) head will get "big." Its constantly normal condition, whatever confusion of tongues may be encountered, is one of the best assurances that the present experiments will be made to succeed, if success is in them.

THE ELEMENTS OF VALUE IN A STREET RAILWAY.

The settlement of the long-pending controversy between the city of Chicago and its two great street railways, which is reported in another column, affords a notable illustration of judicious management of a most troublesome problem. Some of the numerous knotty questions that had to be dealt with were settled by ordinary bargaining—give and take—because it was impossible to find a more rational basis; but in spite of this, the report of the special valuation commission, Messrs. Arnold, Cooley and du Pont, constitutes one of the most interesting features in the history of the matter, for although even these conscientious and careful engineers were obliged to decide some of the questions referred to them by rule of thumb, their report is instructive as giving some indication of why they did so. It is an excellent example of methodical dealing with a subject which at first seems to defy systematic treatment.

This commission was appointed by a committee of the city council to test the inventories presented by the railroads, and to report as to their reasonableness. The commission appears to have had no detailed instructions. After a good deal of study the conclusion was reached that the only satisfactory way to decide what should be considered the true net earnings of the lines was to assume that they would always be 30 per cent. of the gross receipts; and in trying to estimate the cost of the track and overhead structures per mile, the commission was again forced to abandon its elaborate studies of the values of different sections, and to measure the value of each and every line by the average cost per mile of construction throughout all of that company's lines in the city. Nevertheless the frank and businesslike tone of the report gives a feeling of confidence that the commission has done the wisest thing possible. It is, of course, impossible for the superficial observer to form an intelligent opinion as to the equity of the bargain which has been made between the city and the roads, but the fact that an agreement has been reached tends to sustain the fairness of the valuation.

The commission had to do its work in about five months, and therefore engaged about 50 assistants. Mr. Arnold, who was elected chairman of the commission, had a hand in appraising the Chicago street railways in 1902. To avoid any criticism as to local prejudice, engineers from Detroit and Toledo were called into consultation. In estimating the value of real estate and also of horses and some other kinds of property, outside experts were called in; and on the legal status of the ordinances and certain other relations between the roads and the cities, the advice of lawyers was used.

The report begins with a discussion of certain preliminaries that had to be cleared up. One of these was the question whether the cable railways should be considered as operating cable systems, or as useful only to be converted into electric roads. It was finally decided that the lines on Wells street, and in the western and southern parts of the city, should be considered as railways, and those in the other parts of the city as scrap. The question of allowance for pavements laid by the companies was settled by the lawyers.

In valuing the physical property the commission took account of legal expenses, including those incurred in securing right of way; interest during construction; brokerage; and the usual allowance for contingencies, all these together making an addition of 10 per cent. to the physical property.

The franchises of the companies were in a state of confusion. The different lines of road are running under 407 franchises, and these expire at all sorts of dates.* To estimate the value of a franchise it is necessary to know the earnings of the line, but there is no record from which to compute the earnings of the separate lines. The city has in the past granted extensions of certain lines, and it was claimed by the railroads that in authorizing an old and a new line to be worked together, the city had extended the franchise of the older one. The commission finally decided, however, that it was not important to value small franchises separately, whether they had or had not expired, for the city now proposes to buy the lines, and the only question is as to how long a period must be estimated as likely to elapse before the city can or could purchase the lines under the law. The courts have not yet decided as to the city's rights in this matter. If it were to proceed to acquire by eminent domain, from 12 to 24 months would be required, and the commission finally decided that an average of 18 months should be adopted; that is to say, it is assumed that in 18 months the city could take the railways in spite of the stockholders. Franchises which contain an undisputed date of expiration are estimated as good for the unexpired terms of their grants.

In trying to apportion the gross receipts of the companies by streets and divisions, the commission found that nothing could be done; but the records of car mileage could be thus divided, and it was decided to apportion receipts on the basis of car mileage. This is the strongest dose of pure assumption that we find in the report, for it implies that on each and every line the number of cars run has been maintained at a fair proportion of the number of passengers desiring to be carried. In the congested district in the congested hours this must be a violent assumption, we should think.

The railways issue transfers equal in number to about 40 per cent. of the total passengers carried, and it became important to estimate how much traffic these represented. All that could be done, however, was to conclude that the northbound transfers would equalize the southbound, and thus offset each other.

The value of a franchise also includes an estimate of the present worth of net earnings of future years. The estimates of earn-

*The Chicago City Railway operates 219 miles of track, and the Chicago Union Traction Company, 486 miles.

ings were based on Arnold's law of increase, accepted by the railroads in 1902; and the present value of such earnings, taken at the middle of each year, was computed on the basis of 5 per cent. compound interest.

It was claimed that when the franchise on a particular street had expired the remaining franchises on that street were, therefore, valueless; but the commission believes that this is not a live question, for the people are bound to have good service when they can get it, and the lines will be kept running somehow.

The main conclusions of the report are named under two heads: value of franchises and value of physical property. For the franchises, four different valuations are given; first, on the assumption that the city could take the roads in 12 months; second, on an assumed period of 18 months, and, third and fourth, on periods of 24 months and 36 months. As before stated, the commission believes 18 months to be the right assumption. Having followed the principles outlined, the values of the lines of the two companies are found to be—

	Without paving.	With paving.
Chicago City	$20,536,510	$22,369,068
Chicago Union Traction	26,116,237	28,625,714
	$46,652,747	$50,994,782

The main terms of the agreement between the city and the companies are given in another column. The mayor had hoped for 60 per cent. of the profits instead of 55 per cent., and the officers of the railways, who had wanted about 73 millions (together), held out for 53 millions till the last minute; but the newspapers report both sides as expressing cheerful acquiescence in the final bargain.

November Accidents.

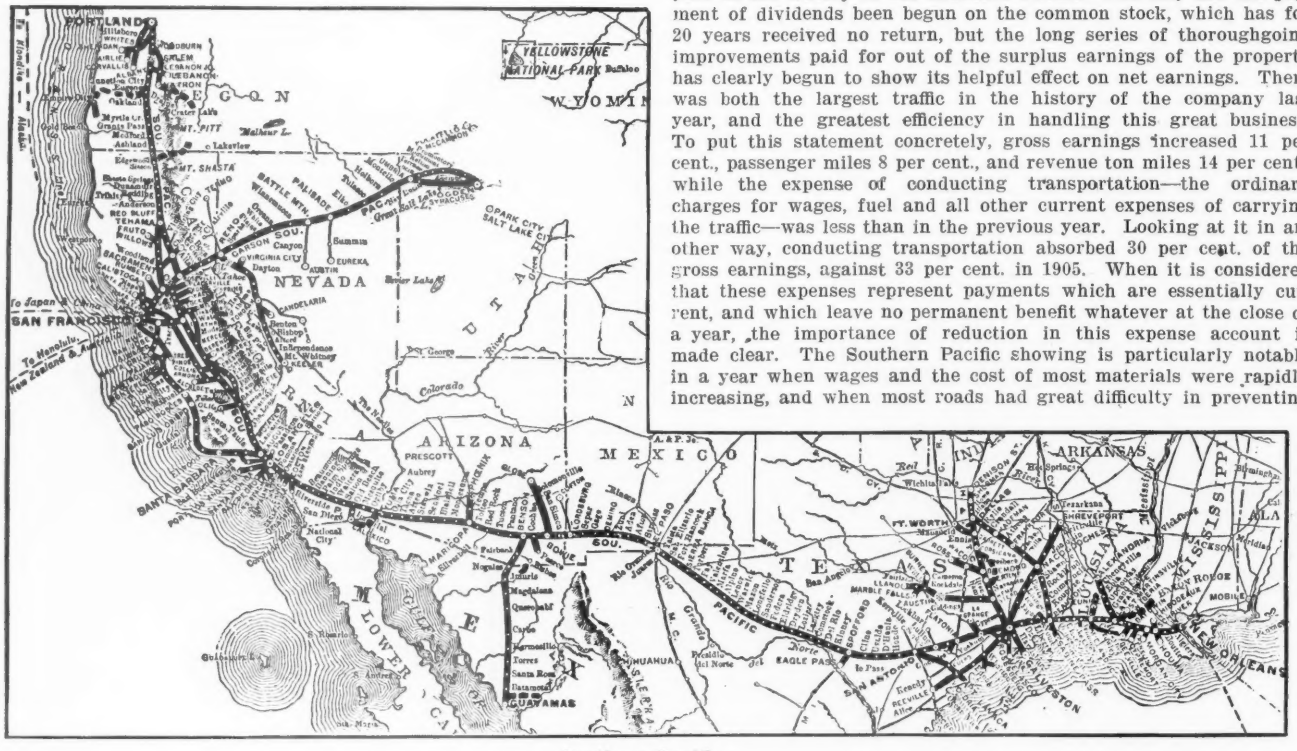
The condensed record of the principal train accidents which occurred in the United States in the month of November, printed in another column, contains accounts of 37 collisions, 28 derailments, and 2 other accidents. Those which were most serious, or which are of special interest by reason of their causes or attending circumstances, occurred as follows:

	Place.	Nov.	Killed.	Injured.
1.	Quinnisec Junction, Mich.	1st	4	10
2.	Ellsworth, Minn.	3d	0	16
3.	Liberty, Pa.	9th	1	2
4.	Loveland, Ohio	9th	1	10
5.	Eureka, Mo.	11th	0	12
6.	Woodville, Ind.	12th	48	37
7.	Grassy Sound, N. J.	14th	0	14
8.	Ripley, Tenn.	17th	3	3
9.	Stanley, Wis.	26th	2	1
10.	Lawyer, Va.	29th	7	10
11.	Bloomington, Ill.	30th	1	14

Sixty-seven accidents is a large number for a single month, considering that we throw out all that are of minor importance. The average number in our record for the past 10 months has been 47.2, and the average number treated as "prominent" has been 8.5, each month, as compared with 11 now. In March, May, July, August and October there were notable disasters, and the aggregate killed in these (one accident in each of the months named) was 127. Now we have a month with two notable cases, Woodville and Lawyer. These two are the only ones in the present list which appear to be out of the ordinary. They have been discussed in past issues, and there is not likely to be any further information of value concerning them until the Government report appears. The number of electric car accidents reported in the newspapers of the United States in November was 10; one person killed, 28 injured.

Southern Pacific.

The past year is in more than one sense an especially important year in the history of the Southern Pacific. Not only has the payment of dividends been begun on the common stock, which has for 20 years received no return, but the long series of thoroughgoing improvements paid for out of the surplus earnings of the property has clearly begun to show its helpful effect on net earnings. There was both the largest traffic in the history of the company last year, and the greatest efficiency in handling this great business. To put this statement concretely, gross earnings increased 11 per cent., passenger miles 8 per cent., and revenue ton miles 14 per cent., while the expense of conducting transportation—the ordinary charges for wages, fuel and all other current expenses of carrying the traffic—was less than in the previous year. Looking at it in another way, conducting transportation absorbed 30 per cent. of the gross earnings, against 33 per cent. in 1905. When it is considered that these expenses represent payments which are essentially current, and which leave no permanent benefit whatever at the close of a year, the importance of reduction in this expense account is made clear. The Southern Pacific showing is particularly notable in a year when wages and the cost of most materials were rapidly increasing, and when most roads had great difficulty in preventing their conducting transportation total from increasing over the previous year's figure. The reason that the Southern Pacific could carry a so much larger traffic at less expense than the smaller traffic of the year before lies in the years of steady and continuous building up of the transportation machine. The old Southern Pacific was by no means a first-class railroad. Hundreds of miles of its through line furnished no traffic at all, and the line itself was an expensive one to operate. Under the present management not only has traffic been developed to a remarkable degree, both by encouragement of local industries and the establishment of the only through traffic route under one management from the Atlantic to the Pacific (from San Francisco to New Orleans over the Southern Pacific; from New Orleans to New York on steamship lines controlled by the company), but the railroad itself has been turned into a through line in the modern use of the term. Heavy rails have replaced light ones; heavy locomotives and high capacity cars, light and small equipment; grades and curvatures have been cut down, new sidings laid, new yards laid out, terminal facilities extended and new branches built. The Southern Pacific to-day operates nearly 10,000 miles of line and has the second largest gross earnings of any railroad in the country. It was able last year to operate its rail lines on 63.31 per cent. of its gross earnings.



Southern Pacific.

In contrast to the decrease in expense of conducting transportation, both maintenance accounts show considerable increases. Maintenance of way increased over $2,500,000, or 19 per cent. Of this increase, $1,800,000 was for reserve for future maintenance, renewals, etc., a new charge to operating expenses. In connection with this charge, however, as also in regard to the same charge mentioned in the annual report of the Union Pacific, it must be remembered that this money has probably not yet been spent on improvement of the lines, but is reserved for future expenditures of this sort. It would, of course, be perfectly possible to reduce ordinary

maintenance of way expenses in the succeeding fiscal year by this amount. It is probable, however, that a similar charge will be made each year in the future, with the result that as long as this policy is continued such charges represent a direct additional maintenance expense. The rest of the increase was due to the expenditure of $536,000 in several times moving the Southern Pacific tracks on the side of the Salton basin, and in finally building about 40 miles of new line above the original location. These changes were necessitated by a crevasse of the Colorado river near Yuma, Ariz., which caused a continuous flow of that stream into the Salton sink about 75 miles farther north, converting that basin into a salt lake about 45 miles long, about 15 miles wide, and with an extreme depth of about 80 feet. This break occurred early in 1905. The efforts to divert the course of the river to its former channel were described in the *Railroad Gazette* of November 9, 1906. Maintenance of way and structures cost $1,744 per mile of main and second track, against $14,761 in 1905. This covers 164 miles of second track.

Maintenance of equipment increased $1,296,000, or 10 per cent., mainly as a result of a much larger charge than in 1905 for equipment destroyed, condemned or sold. This item was $2,200,000, larger by $1,369,000 than in 1905. There was a new charge of $313,000 for future maintenance, renewals, etc., similar to the corresponding charge under maintenance of way. The average cost of repairs per unit of equipment was as follows: Locomotives, $3,531, against $3,473 in 1905; passenger cars, $883, against $920 in 1905; freight cars, $104, against $85 in 1905. All of these charges are large, but particularly the cost of freight car repairs. There were 127 locomotives (over 8 per cent. of the total), 47 passenger cars, 3,389 freight cars and 103 road service cars destroyed, condemned or sold during the year. Their replacement by better equipment was the principal cause of the large increase of 59 tons, or 19 per cent., in the average trainload east of El Paso, and 30 tons, or 8 per cent., on the lines west. The trainload for the system, including both revenue and company freight, was 383 tons, against 341 tons in 1905. The gain in efficiency of operation is shown in another way by the fact that though there was an increase of 10 per cent. in ton mileage, there was a decrease of over 1 per cent. in revenue freight train miles. There have been ordered 154 locomotives, 130 passenger cars, 3,000 refrigerator cars and 4,400 other freight cars; also three steel passenger and freight steamers of 10,000 tons displacement and other miscellaneous floating equipment; all at an aggregate cost of about $17,000,000.

The Southern Pacific is remarkable among railroads in that coal and coke make up less than 3 per cent. of its total tonnage. Products of mines other than coal, ores, stone and sand, however, make up 16 per cent. of the total. Lumber furnished 17.5 per cent. last year, against 15 per cent. in 1905, an increase in tons of over 1,000,000. Manufactures account for 15 per cent. and also merchandise and miscellaneous for 15 per cent. of the whole tonnage. The latter of these two classifications increased some 150 per cent. over 1905.

The principal results of the last two years' operations are summed up in the following table:

	1906.	1905.
Mileage worked	1,192	9,138
Passenger earnings	$29,224,510	$26,412,631
Freight earnings	63,908,981	57,759,312
Gross earnings	99,123,550	89,403,632
*Gross earnings	105,632,550	99,515,158
Maint. way and structures	16,319,683	13,731,801
Maint. of equipment	14,286,111	12,989,732
Conducting transportation	29,683,882	29,691,601
Operating expenses	62,752,771	58,530,015
*Operating expenses	68,120,893	63,664,235
Net earnings	36,370,779	30,873,617
*Net earnings	37,511,656	31,850,923
*Net income	19,192,647	12,431,973
Dividends	7,716,125	2,769,431
*Year's surplus	11,118,837	3,426,798

*Including water lines and the Southern Pacific Terminal Company.

NEW PUBLICATIONS.

The Economics of Railroad Construction. By Walter Loring Webb. New York: John Wiley & Sons, 1906. Cloth, 339 pages. Price, $2.50.

It is somewhat difficult to give an impartial estimate of Mr. Webb's new book because the temptation is strong to compare it chapter by chapter with Wellington's classic work of twenty years ago, which, despite the progress of engineering in this and many other fields, still stands by itself, unassailable, unimpeached. A good part of Wellington's data is now antiquated and of comparatively little value to modern engineers, but the data are of far less importance than the fundamental theories deduced therefrom and so clearly propounded and elaborated. Webb has introduced some new data, but he has evolved no new principles or improved upon the old. Nor can it be said that he has brought the "Economic Theory of Railway Location" up-to-date, for this obviously could not be done in a book hardly one-quarter the size of its predecessor.

While the author in his introduction says that he is writing from the standpoint of the constructing or operating engineer, the opening chapters dealing with the non-technical phases of the subject, statistics, organization, capitalization, valuation and estimation of volume of traffic are more satisfactory reading than the later chapters dealing with the strictly engineering problems. The somewhat complex study of valuation is written of briefly but clearly, but the conclusions arrived at in the following chapter on estimation of volume of traffic are vague and unsatisfactory. Such a subject cannot be treated with justice within the limits of 7,000 words.

In discussing the operating and physical elements of the problem the same method is used throughout. Taking the classification of operating expenses adopted by the Interstate Commerce Commission as a basis and using the percentages of each to the total as given by the statistics of the last ten years the effect of any element in the problem on each of the items is estimated and the total effect, expressed as a per cent. of the operating expenses, is used in determining the money value per train mile from the average cost per train mile for the United States. This method is not original nor are the actual figures employed of much value in working out a concrete problem, for the percentages in any individual average will probably vary widely from the general average. Wellington used a somewhat different classification, but this does not affect the conclusions he derived. That elusive factor, train resistance, enters into the solution of a number of the problems discussed and one chapter is devoted to it. Whether from design or not, the author avoids championing any one of the numerous formulæ presented. Unfortunately the book is full of typographical errors, some of minor importance and many seriously affecting the argument. To the careful reader this gives at once a bad impression.

The Workings of Railroads. By Logan G. McPherson, Lecturer on Transportation at Johns Hopkins University. Published by Henry Holt & Co., New York. 282 pages. 5 in. x 7 in., cloth. $1.50.

Mr. McPherson, well known to the readers of the *Railroad Gazette* from connections he has had with the Baltimore & Ohio and with the Southern Railway, has gotten up from a course of lectures, which he delivered at Johns Hopkins University in the spring of 1906, a book which he describes as a primer of railroad working and management. Mr. McPherson believes, with Mr. Acworth, of England, that the need at this time for books giving, as this one does, a clear presentation of first principles, is fully as great as the need for more advanced and highly specialized works on transportation. In this we heartily concur. He addressed his class, not only as students, but also as voters who were ultimately going to shape the economic legislation of the country, and his book is written for voters rather than for specialists. We wish that all voters would read it. While covering much familiar ground, it puts a great deal of information into small space, and is at once easy to read and interesting. The chapter headed "Correlation," showing in some detail the actual start of a railroad day, presents a vivid picture of the multitude of little things that have to be organized and harmonized to make a road run and to enable it to do business.

CONTRIBUTIONS

The Overcrowding of Passenger Trains.

Chicago, Ill., Dec. 13, 1906

TO THE EDITOR OF THE RAILROAD GAZETTE:

Apropos of the interesting tabulation of the seating capacity and number of passengers on 22 trains on the New Haven road, given in your issue of December 7th, would it not be pertinent to inquire how many passengers remained on those trains to their journey's end? Without this fact it seems to me that it is impossible to make a comparison between the average of 359 passengers for the 22 trains with the average of 81 passengers per train "retained" by the New Haven company for its whole system last year. Train loads of suburban passengers begin to thin out very rapidly after the first stop, and out here I have known trains whose seating capacity was taxed beyond the limit at the start to run between the last stations without a single passenger. Except with some approach to crowding at the initial station it is practically impossible to make suburban traffic pay. Some railroad authorities go to the extent of saying that it does not pay anyway, except indirectly through the building up of freight traffic along the line. This, I think, however, is to be taken with several grains.

SLASON THOMPSON.

Railroad Organization.

New York, Dec. 26, 1906.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with interest the article in your last issue on "Railroad Organization." As you say, "the characteristic British organization is sharply departmental, the head of the motive power department ranking almost with the general manager, corresponding in rank to our President, and often reporting to nobody but his directors." As you further say, "the Pennsylvania organization is straight divisional." It has been characterized as the "two-czar"

system, all the power being lodged in the hands of the general manager and the division superintendent.

I think you correctly state the advantages of the two systems, the one confiding to experts the handling of such diverse problems as those relating to motive power, road maintenance and train operation, the other seeking for harmony and success by the control of one strong arm over the three elements held to be inseparable. Many attempts have been made to secure the advantages of the two types, usually by having one officer report to two or more superiors, and as a rule this has not worked well. The Rock Island organization of 1904 was an effort to secure these advantages by a separation along what seemed to be the natural lines of cleavage. If you ask the Superintendent of Transportation how often he would like to consult with the Superintendent of Motive Power, he will say several times a day; if you ask him as regards the Engineer of Maintenance of Way he will say once a month. To move traffic, the superintendent should have the vehicles and men to make the movement with. He can do it very well on a road furnished him.

After all, this works out all right in marine matters. Consider the traffic on the Great Lakes. Here we have a waterway with its complications of the Detroit river, St. Clair canal and the Soo locks, maintained and signaled by the government, while the traffic is moved by captains in full charge of their ships and crews.

F.

Tempering High Speed Steel.

At a recent meeting of the Master Blacksmiths' Association, Mr. Geo. Lindsay, in discussing annealing of high speed steel, said he had been called upon to make a forging of this material at short notice and it occurred to him that, if the exclusion of air was the most important thing in the process, it would be well to try a lead bath. Accordingly, a piece of 4-in. pipe about 12 in. long was welded solid at one end to form the pot, which was filled two-thirds full of lead. The lead and the pot were raised to a high temperature, the steel was placed in it and they were allowed to cool together. After it had cooled down to the melting point of lead, or about 630 deg. Fahr., it was reheated sufficiently to remove the steel, which was then allowed to cool slowly. After this treatment it could be cut, in a lathe, like ordinary carbon steel. The suggestion is made as a convenient shop wrinkle.

The same speaker said that in hardening this peculiar metal it was necessary to forge it, lay it down to cool and then heat it again, but not far back from the cutting edge. Great care must be taken in the heating, notwithstanding the common opinion that it cannot be made too hot. Too rapid heating is apt to fuse the edges, so that they will become brittle and crumble. The steel should be given time to absorb the heat. Another danger in rapid heating is that the blast is apt to get through the coke of the fire and oxidize the edges. When the tool is removed from the fire the scale should be carefully removed and the air applied at the back, especially in the case of lathe tools. For milling cutters, taps, reamers and similar tools, where long and slow heating is required, a furnace is almost indispensable, though hollow fires may be made to do good work. An oil bath should be used for cooling, and the temper drawn as in carbon steel.

The New York Connecting Railroad.

The Pennsylvania Railroad and the city of New York have at last come to terms regarding a franchise for the important project of a belt line through Brooklyn and Queens and over the East river at Ward's Island to a connection with the New York, New Haven & Hartford at Port Morris. At a conference between the mayor and other city officials and Vice-President Samuel Rea, of the Pennsylvania, held December 21, the important details of the grant were agreed upon and as soon as a complete draft can be drawn up it will be signed and accepted by both parties; work can then go ahead immediately.

The relation of the New York Connecting Railroad to the other improvements now being made by the Pennsylvania in and around New York will be understood by a study of the accompanying map. President A. J. Cassatt in a letter to the Mayor last January outlined the company's extensive plans as follows:

The work upon the Pennsylvania station in Manhattan and the extension by the Pennsylvania, New York & Long Island Railroad of the Pennsylvania Railroad System from Jersey City into Manhattan and through it to Brooklyn and Queens boroughs has progressed so far that it is now necessary to prepare for the efficient handling and distribution of the traffic which such extension and new station must bring to New York. Intimately and necessarily connected with this traffic are the proposed developments of the passenger and freight facilities of the Long Island Railroad in the boroughs of Brooklyn and Queens and the proposed construction of the link to be called the New York Connecting Railroad and intended by means of its bridge over the East river to establish for Brooklyn and Queens direct railroad communication with New England and the North. The Pennsylvania Railroad owns the shares of stock of the Pennsylvania, New York & Long Island, and a majority of the shares of the stock of the Long Island Railroad, and it and the New York, New Haven & Hartford, equally own the shares of stock of the Connecting Company.

The proposed facilities include:

1. The establishment for the Pennsylvania, New York & Long Island Railroad of a great terminal to be called "Sunnyside Yard" between Jackson and Thompson avenues in Queens. It is to be upwards of one mile long, to average nearly a third of a mile wide, and to include an area of about 8,712 city lots, or about 400 acres. This yard will be of prime necessity to efficient operation of the new system in Manhattan and to proper care of the great additional traffic which we believe our improvements will bring to the city. There is, within the Borough of Manhattan, no suitable place for so great a terminal yard. The site chosen is almost entirely open and unused land; and, apart from its great advantage to Manhattan and Brooklyn, its establishment in Queens, with the business incidental to it, must very considerably increase the general volume of business in that borough. The publicity of our intentions has already materially enhanced the value of neighboring real estate.

2. The elimination of grade crossings on the railroads owned or leased by the Long Island Railroad. These costly changes include the lines from Flatbush avenue station out to the Brooklyn borough line, from our Long Island City station to Jamaica and from that station by the Manhattan Beach line through East New York around to the Bay Ridge terminal, there connecting, by the proposed straight and relatively short ferry across the Upper Bay, with the Pennsylvania freight terminal at Greenville, N. J. The latter improvement includes also the branch line to Manhattan Beach. The work is to be done under requirement of an act of the legislature, which, apart from the elimination of grade crossings, provides no facilities to the railroad companies. They are to contribute one-half of the expense and the city the other half up to the limit of $5,000,000. As the cost will materially exceed that limit, the investment of the companies for this purpose will be greater than one-half. Like improvement in Queens has already been suggested by the authorities of Queens, and is under consideration by the railroad companies.

3. While eliminating the grade crossings, we have deemed it wise to greatly enlarge the facilities for freight distribution in the boroughs of Brooklyn and Queens. The present facilities are antiquated and insufficient, and provide for only a part, and it is believed, a small part, of the trunk line traffic which it is to the interest of the companies and of the city should be brought to and carried from those boroughs. We desire, therefore, to improve and extend our lines within their limits. And our further plan is to provide ready for use upon the completion of the Connecting Railroad between Queens and Bronx boroughs, ample local delivery yards in Brooklyn and Queens in addition to those already existing. The sites of the new or substantially new yards are as follows:

(*a*) Freight terminal at Bay Ridge, between 64th and 66th streets, extending from Fourth avenue to the bay.
(*b*) Delivery yard at Fifth avenue and 65th street, Bay Ridge.
(*c*) Delivery yard at Fifteenth avenue and 60th street, Bath Junction.
(*d*) Delivery yard on Gravesend avenue (Parkville).
(*e*) Delivery yard at Manhattan Beach Junction, East Sixteenth street and Avenue I.
(*f*) Delivery yard, Vandeveer Park, Flatbush avenue.
(*g*) Delivery yard at Paerdegat Basin near Canarsie. This is convenient to the contemplated municipal improvement of Jamaica Bay.
(*h*) Delivery yard at Rockaway avenue.
(*i*) Freight terminal at East New York.
(*j*) Delivery yard at Bushwick Junction.
(*k*) The construction of a new freight terminal at Third street and Hunter's Point avenue, and of a freight delivery yard north of Hunter's Point avenue.

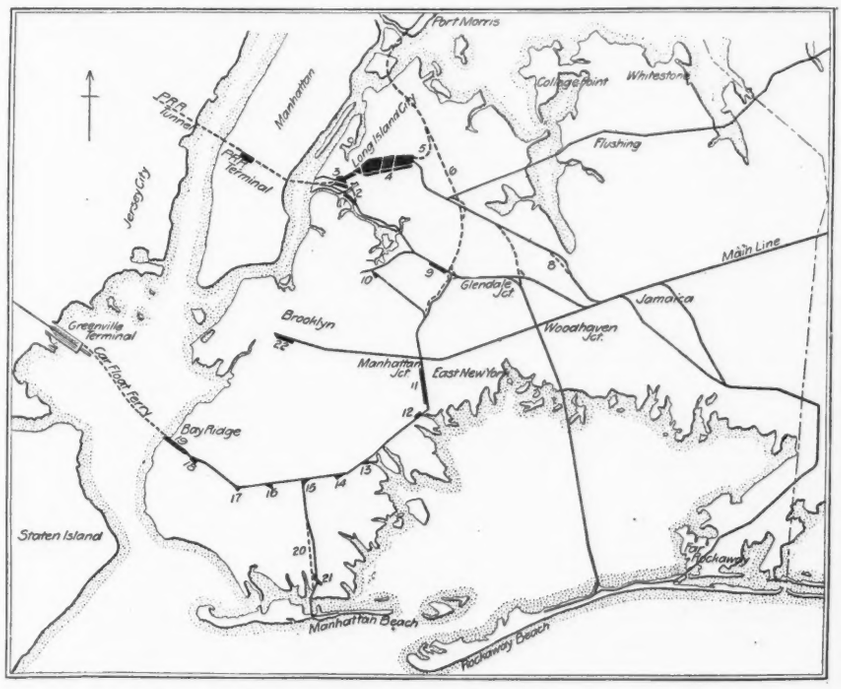
In connection with these improvements is the enlargement of the freight terminal yards at Flatbush avenue, the existing freight yard at Varick avenue, Bushwick; the enlargement of the terminal at Sheepshead Bay, and also the improvements on the north side of Newtown Creek between Van Alst avenue and Pearsall street, by the construction of bulkheads, piers, tracks and other features of a water front freight terminal.

The justification for so great and costly an enlargement of freight and passenger facilities must, of course, be found in future increase of business incident to such new facilities as well as to the establishment of the short, direct car float ferry from Greenville to Bay Ridge and to the proposed railroad connection between Queens borough and the New Haven system in Bronx borough. The disadvantages of the insular isolation of Brooklyn and Queens thus brought to an end, their great natural advantages should lead at

once to a vast and profitable development of their manufacturing and commercial traffic with the rest of the United States.

4. The completion of the Atlantic avenue improvement. This includes not only the removal of railroad tracks from the surface of that avenue at the joint expense of the railroad company and the city, but a large and very expensive improvement at the sole cost of the company of the passenger and freight terminal at Flatbush avenue. This point will tend more and more to be a great and probably for the future the most important point of distribution of passengers within Brooklyn. When the Connecting Railroad shall be finished, residents of Brooklyn and Queens will travel by that route without change of cars to New England and the North and East as well as to the West and South, by way of the Pennsylvania terminal in Manhattan.

5. The Connecting Railroad is to be 12 miles long, to run through a part of Queens borough as yet half rural, although recently much developed by the promise of these improvements, and, by a bridge authorized by the state and federal governments to cross the East river at Ward's and Randall's Islands. Its completion is obviously the key to the development thus proposed of commercial and manufacturing traffic in Brooklyn and Queens. We intend to connect this railroad by a short, direct line with the "Tunnel Line," thus permitting a new and direct all rail communication with New England and the north for Manhattan as well as for Queens and Brooklyn.



Map of the New York Connecting Railroad.

1. Newtown Creek development.
2. New freight connection from North Shore Yard to Montauk Division.
3. New freight terminal.
4. Sunnyside Yard.
5. Connection from New York, Connecting R. R. to Sunnyside Yard.
6. New York Connecting Railroad.
7. Glendale cut-off between Main Line and Rockaway and Montauk Divisions.
8. Maple Grove cut-off.
9. Freight yard, Bushwick Junction.
10. Freight terminal, Varick Ave., Bushwick.
11. Freight terminal, East New York.
12. Freight delivery yard, Rockaway Ave.
13. Freight delivery yard, Paerdegat Basin.
14. Freight delivery yard, Vanderveer Park.
15. Freight delivery yard, Manhattan Beach Junction. Flatbush ave.
16. Freight delivery yard, Parkville.
17. Freight delivery yard, Bath Junction.
18. Freight delivery yard, Bay Ridge.
19. Freight terminal yard, Bay Ridge.
20. Change of line, Brighton Beach improvement.
21. Terminal, Sheepshead Bay.
22. Freight terminal yard, Flatbush Ave.

6. Construction of the Montauk cut-off, which is a new freight line connection for the Long Island Railroad from the North Shore yard to the Montauk division. This is indispensable to rapid and adequate movement of freight.

7. Construction of the Glendale cut-off between the main line, Montauk division and Rockaway Beach division of the Long Island Railroad. This is necessary for improved passenger service and to give direct connection with the tunnels to Manhattan.

8. The Maple Grove cut-off, straightening and improving the main line of the Long Island Railroad at Union avenue, Hillside drive and Lefferts avenue.

The history of the struggle for a franchise from the city for the New York Connecting is interesting. The first application of the Connecting Company for a franchise was presented to the Rapid Transit Commission on June 11, 1903, and was referred to the committee on plans and contracts. After some months of consideration of the details of the plan the committee reported a form of franchise on June 16, 1904, just a year later. This was submitted for the approval of the Board of Aldermen, as the charter then required, and referred to the proper committee. One hearing was held, after which came prolonged and unexplained delay. Before the end of the second year the protest of Brooklyn and Queens against the "hold up" became clamorous, and the Pennsylvania Railroad joined in a general movement to secure legislation that would transfer from the Aldermen to the Board of Estimate and Apportionment all control of franchises. The object was to secure a fair court, and the businesslike attention given franchise subjects by the Board of Estimate, coupled with the ending of the recurrent scandals about matters in the hands of the Aldermen, has more than justified the passage of the charter amendments resulting from the agitation.

On April 18, 1905, after the passage in the lower house of the Legislature of the charter amendments in question, the Aldermen returned the Rapid Transit Board's certificate to the Connecting Company with their disapproval, proposing five amendments and demanding that these be incorporated in the franchise before their approval could be given. The amendments were of slight consequence except one, which would compel the road to carry passengers between any points on its line for 5 cents, thus bringing it within the local rapid transit business. The company pointed out that it could neither accept this, nor two other minor suggestions, but the action of the Aldermen was not treated seriously.

On November 16, 1905, after the new legislation had become effective, the company renewed its application before the Rapid Transit Board and further meetings and conferences followed, in the course of which all of the details were again discussed. On March 1, 1906, the Plans and Contract Committee made a report of a form of franchise under which a flat payment of $100,000 was to be made to the city and annual payments of $25,000 for ten years and $50,000 a year for the succeeding 15 years. At the end of 25 years under the charter the figures of compensation to the city must be readjusted. Under other clauses of this proposed certificate the company agreed to assume every charge of any nature that could possibly come from the carrying out of its plans, and to relieve the city of any expense whatever. The company felt, and stated publicly, that the annual rates were much too high, in view of the great benefit the building of the road would confer, indirectly, upon the city and the element of risk in the company's new undertaking. It agreed, however, to the Rapid Transit Commission's proposals. A conference committee of that board and the Board of Estimate and Apportionment was appointed, with Mr. McGowan as chairman. The committee and the company then commenced the negotiations which have just ended.

Under the terms of the franchise as agreed upon the company will pay to the city 10 per cent. more than the amounts proposed by the Rapid Transit Commission, namely, $110,000 in two yearly payments, $27,500 a year for the first ten years and $55,000 a year for the next 15 years. The width of the right of way over or under any street or road now open or in use or hereafter to be opened across the route of the railroad company shall not exceed 100 ft. in width. The plans for the proposed bridge and for all passenger stations shall be submitted to the Municipal Art Commission for its approval. None of the property of the railroad company shall in any way be used for advertising purposes.

The definition of local passenger traffic is changed to include the carriage of passengers between any two points within the present limits of the city of New York, excepting only such transference of passengers traveling beyond the limits of the city as may be necessary in the carrying on of the business of the various connecting roads. It leaves the question of passenger rates to be settled by the Board of Rapid Transit Commissioners, the Board of Estimate and Apportionment and the Mayor, whenever in the future the company is able to use this road for such a purpose. Under the terms of the original contract, however, the definition of the local traffic would have permitted any of the connecting roads to have charged such fare as they pleased between any point on the road of this company and any point on the road of one of the connecting lines within the limits of the city without obtaining the consent of the local authorities. Under the amended definition of local traffic not only the question of passenger rates on this road alone, but the question of passenger rates on this line when used in con-

nection with other connecting roads within the city limits, is left to the local authorities for adjustment. No modification of any of the terms or conditions of the contract shall be valid unless approved by the Board of Estimate and Apportionment and the Mayor of the city of New York.

In addition any alteration which is required to be made to any sewerage or drainage system on account of the construction or operation of the road is to be made at the sole cost of the railroad company. In case a dispute arises concerning the necessity for such alteration, the matter is to be referred to the Supreme Court for determination.

The sums which are to be paid to the city as compensation for the franchise are specifically declared to be in addition to all taxes in order to avoid any misunderstanding such as has arisen in similar cases.

The approval of the Board of Estimate and Apportionment or its successors and of the Mayor is required to render effective all readjustments of terms at the end of the 25 year period.

The Appellate division of any department through which a portion of the road may run is made the final arbiter of the compensation to be paid.

Pending the granting of the franchise the railroad company has prepared complete plans for all of the details of construction and is in a position to begin work almost immediately. The plans for the East river bridge are complete and have been approved by the War Department and all of the right-of-way has been secured.

Railroad Built in 1906.

Table Showing Milcage Built in 1906, Classified by States.

States.	No. of Cos. building.	1906.	No. of Cos. building.	1905.
Alabama	8	81.9	4	103.08
Alaska	1	15.5	2	13.9
Arizona	3	47.81	1	45.47
Arkansas	19	260.24	11	198.51
California	11	139.47	6	34.27
Colorado	8	113.36	4	83.15
District of Columbia	1	1.0	..	.....
Florida	12	205.75	4	10.8
Georgia	7	182.9	6	120.0
Idaho	6	184.4	5	109.7
Illinois	9	119.41	8	249.49
Indiana	6	101.63	3	171.79
Indian Territory	2	99.4	4	98.4
Iowa	..	.....	3	15.2
Kansas	3	53.12	2	21.6
Kentucky	7	54.57	5	76.45
Louisiana	12	333.84	10	99.3
Maine	4	44.71	2	65.26
Maryland	..	.....	1	40.7
Massachusetts	1	4.5	1	1.0
Michigan	3	24.8	9	87.76
Minnesota	6	138.07	5	108.29
Mississippi	8	165.14	5	120.5
Missouri	4	29.5	3	48.99
Montana	1	26.0	..	.....
Nebraska	3	174.55	1	47.0
Nevada	4	282.05	3	86.99
New Jersey	1	2.67	3	9.3
New Mexico	2	151.0	3	122.5
New York	3	95.02	4	49.68
North Carolina	4	34.0	8	124.5
North Dakota	2	247.47	4	520.75
Ohio	4	61.0	3	84.06
Oklahoma Territory	2	36.0	3	154.4
Oregon	7	61.11	5	68.42
Pennsylvania	14	117.72	8	76.7
Rhode Island	..	.....	1	3.5
South Carolina	3	41.0	2	28.0
South Dakota	6	388.23	4	116.0
Tennessee	6	65.0	5	151.2
Texas	18	634.67	9	338.5
Utah	6	153.52	5	66.02
Vermont	..	.....	1	5.0
Virginia	5	121.27	2	13.96
Washington	5	103.06	3	49.5
West Virginia	5	78.78	8	165.23
Wisconsin	5	141.84	7	142.65
Wyoming	3	206.95	2	40.85
Total, United States	250	5,623.33	198	4,388.03
Canada	15	1,007.05	11	1,180.86
Mexico	8	296.5	5	238.42

UNITED STATES.

ALABAMA.

Atlanta & St. Andrews Bay—Dothan south to Alabama-Florida state line	16.00
Central of Georgia—Henry Ellen to Margaret	13.00
Haynesville & Montgomery—Tyson to Haynesville	9.00
Louisville & Nashville—Birmingham Mineral division, Blue Creek extension	1.12
Mobile & Western—Mann to Mission Church	14.00
Seaboard Air Line—Mining spur near Ohatchie	4.50
Southern—Extension of Littleton branch, near Flat Top, 4.00 miles; Woodlawn-Bessemer cut-off, 3.28 miles; total	7.28
Sumpter & Choctaw—Bellamy to Nix	17.00
	81.90

ALASKA.

Council City & Solomon River—John's Creek to Penelope Creek	15.50

ARIZONA.

Arizona & Colorado (A., T. & S. F.)—Mile post 50.47 to mile post 80.18	29.71
El Paso & Southwestern—Corta to Lowell	3.10
*Gila Valley, Globe & Northern—From San Carlos towards Fort Thomas	15.00
	47.81

*Change in location of old main line.

ARKANSAS.

Cache Valley—Walnut Corner to Walcott, 3.00 miles; Walnut Ridge to Walnut Corner, 2.00 miles; total	5.00
Crittenden—Shell Lake to Heth, 5.00 miles; Shell Lake to Parkin, 8.00 miles; total	13.00
De Queen & Eastern—Provo to Dierks	10.00
Fourche River Valley & Indian Territory—From Camp C to Camp D	4.40
Doniphan, Kensett & Searcy—Kensett to Donipha	1.80
Freeo Valley—Mile post 18 to mile post 22	4.00
Gurdon & Fort Smith (Mo. Pac.)—From connection with Arkansas Southwestern, 50 miles east of Antoine, northeast to near Caddo Gap	30.50
Jonesboro, Lake City & Eastern—Osceola branch—Dell to Osceola, 19.50 miles; branch to Luxora, 2.00 miles; total	21.50
Louisiana & Pine Bluff—Huttig to Dollar Junction	2.50
Manila & Southwestern—Culberhouse to Lunsford	5.00
Prescott & Northwestern—Elberta to Helbig	7.00
Perla Northern—Between Perla and Whittington	7.00
Rock Island, Arkansas & Louisiana (C., R. I. & P.)—From 35 miles south of Haskells to Crossett, 72.30 miles; Eldorado branch, from main line to Eldorado, 36.00 miles; total	108.30
Rogers Southwestern—Rogers to Springtown	21.10
St. Louis, Iron Mountain & Southern (Mo. Pac.)—From Eudora to Arkansas-Louisiana state line	7.89
St. Louis Southwestern—Chicatawba to Blytheville	1.25
Saline Bayou (Southern Pine)—Not specified	4.00
Thornton & Alexandria—Calhoun to Hampton	3.00
Warren & Ouachita—Mile post 13 to Burks	3.00
	260.24

CALIFORNIA.

Barnwell & Searchlight (A., T. & S. F.)—Extension north to California-Nevada state line	3.00
Bay Shore (So. Pac.)—Between San Francisco and San Bruno	3.85
Butte County—Gallagher to North Valley	15.00
California Northeastern (So. Pac.)—Weed toward Klamath Falls	24.80
Coast Line (So. Pac.)—Between Santa Cruz and Davenport	4.86
McCloud River—From a point three miles beyond Bartle to McGavie	11.40
Nevada-California Oregon—Madeline north	9.00
Sacramento Southern (So. Pac.)—Sacramento toward Walnut Grove	.52
Southern Pacific—Wyo to Hamilton	11.04
Western Pacific—North Tesla Junction to Stockton, 2.50 miles; South Tesla Junction, west 7.10 miles; in city of Oakland, 1.40 miles; total	11.00
Yosemite Valley—Not specified	45.00
	139.47

COLORADO.

Argentine Central—Waldorf to Mt. McClellan, 5.00 miles; Owsley mine to connection with main line, 0.50 mile; Waldorf to Vidler Tunnel, 0.50 mile; total	6.00
Arkansas Valley (A., T. & S. F.)—Lamar to Bent, 13.70 miles; Wiley to Big Bend, 4.10 miles; Lays Junction to May Valley, 3.50 miles; Rocky Ford to Columbine, 16.10 miles; Swink to Shelton Junction, 5.40 miles; Holly to Bristol, 13.50 miles; total	56.30
Colorado & Southeastern—Clelland Junction to Murray Junction	.76
Colorado & Southern—Bellevue to Ingleside, 9.04 miles; Plummers to Mahood, 8.66; total	17.70
Denver, North Western & Pacific—Sulphur Springs, west to Kremmling	18.60
Silverton—Yankee Girl Mine to Joker Tunnel	3.00
Silverton Northern—Eureka to Animas Forks	4.00
Union Pacific—Washington mine to Grant coal mines	7.00
	113.36

DISTRICT OF COLUMBIA.

Philadelphia, Baltimore & Washington (Penn.)	1.00

FLORIDA.

Apalachicola Northern—River Junction towards Apalachicola	20.00
Atlanta & St. Andrews Bay—Alabama-Florida state line south to Cottondale	15.00
Atlantic Coast Line—Newberry branch, Newberry to Wilcox	20.00
Birmingham, Columbus & St. Andrews Bay—Chipley to Warsaw	12.00
Charlotte Harbor & Northern—Boca Grande to Gasparilla, 7.00 miles; Pearl River to Hull, 3.00 miles; total	10.00
Florida East Coast—Homestead to Jew Fish Creek, 20.00 miles; on Key Largo, 17.00 miles; total	37.00
Florida West Shore (S. A. L.)—Manatee to Bradentown	1.12
Georgia, Florida & Alabama—Havana to Quincy, 12.00 miles; Carrabelle to Camp Mill, 0.88 mile; total	12.88
Live Oak, Perry & Gulf—Day to Hampton Springs, 32.00 miles; Hampton Springs to Rigler Creek, 10.00 miles; Mayo Junction to Alton, 14.00 miles; total	56.00
Plant City, Arcadia & Gulf—Munninger Junction to Nickolds	6.75
Tallahassee Southeastern (S. A. L.)—not specified	11.00
Tampa Northern—Tampa to Hillsboro River	4.00
	205.75

GEORGIA.

Atlanta, Birmingham & Atlantic—Monk to La Grange	60.00
Central of Georgia—Greenville north to Newnan	23.70
Douglas, Augusta & Gulf—Hazlehurst to Brixton	30.00
Flint River & Gulf—Ashburn to Bridgeboro	32.00
Gainesville Midland—Jefferson to Athens	18.00
Georgia Coast & Piedmont—Weefannie north to Glenville, 15.00 miles; Hilton Junction west to Foxtown, 3.00 miles; total	18.00
Louisville & Nashville—Alaculsey spur, Crandall to Alaculsey	1.20
	182.90

IDAHO.

Oregon Short Line—Nampa to Nampa sugar factory	2.20
Pacific & Idaho Northern—From a point 3.65 miles north of Council to Evergreen	12.60
Payette Valley—Payette to New Plymouth	15.00
Spokane International—Eastport to Idaho-Washington state line	122.00
Washington, Idaho & Montana—Harvard east	9.00
Yellowstone Park (O. S. L.)—Marysville to mile post 40	23.60
	184.40

ILLINOIS.

Aurora & Dekalb—Aurora to Cortland	26.00
Chicago & Alton—Hes to Murrayville	34.30
Chicago & Illinois Midland—Pawnee to Taylorville	17.00
Cleveland, Cincinnati, Chicago & St. Louis—Tilton to Danville	2.21
Coal Belt extension (Mo. Pac.)—From connection with Coal Belt northeast to White Ash	2.54
Herrin & Johnston (Mo. Pac.)—From connection with Coal Belt near Herrin east Johnston City	3.86
Illinois Central—On Zeigler-Herrin branch in Williamson and Franklin counties	2.50
Macomb & Western Illinois—Macomb to Littleton	26.00
Wabash Southern (Mo. Pac.)—Zeigler northeast	5.00
	119.41

INDIANA.

Chicago & Wabash Valley—Range Line to Dinwiddie	3.00
Chicago, Cincinnati & Louisville—Griffith to Hammond at Illinois state line	7.74
Chicago, Indiana & Southern—Indiana Harbor to Dune Park	15.70
Evansville, Suburban & Newburgh—From junction with Newburgh to Boonville	15.00
Indianapolis Southern (Ill. Cent.)—Unionville to Switz City	41.59
Indianapolis & Louisville (C. I. & L.)—Wallace Junction west, 5.00 miles; from point 22½ miles west of Wallace Junction to mile post 33½, 11.00 miles; from 45 miles west to Victoria, 2.00 miles; total	18.00
	101.03

INDIAN TERRITORY.

Eastern Oklahoma—Davis to Sulphur	9.40
Oklahoma Central—Lehigh to Purcell	90.00
	99.40

KANSAS.

Denver, Enid & Gulf (A. T. & S. F.)—Kiowa to Sun City	39.76
Midland Valley—Oklahoma-Kansas state line to Silverdale	6.00
Topeka & Northwestern (Union Pac.)—Emmett to Onaga	7.36
	53.12

KENTUCKY.

Carrollton & Worthville—Carrollton to Worthville	10.00
Chesapeake & Ohio—Marrowbone to Hillier	7.80
Grafton & Upton—Not specified	2.12
Illinois Central—Wickliffe to Winford	3.80
Kentucky Valley—Providence to Blackford	15.40
Louisville & Nashville—Cumberland Valley division, extension up left fork of Straight Creek, 2.45 miles; Major branch near Olcott, 2.20 miles; total	4.65
*Louisville & Nashville—Between Corbin and Saxton	10.80
	54.57

LOUISIANA.

D'Arbonne Valley—Extension west to Pennington	5.00
Engelwood, Alexandria & Southwestern—Engelwood to La Clede Bayou	7.50
Jasper & Eastern (A., T. & S. F.)—Mile post 27 through De Ridder to Cravens	32.00
Kentwood & Eastern—Kentwood to Bolivar	10.00
Louisiana & Arkansas—Packton to Tioga	30.46
Louisiana East & West—Bunkie to Little Platte	21.00
Louisiana Railway & Navigation Co.—Angola to Edenborn, 71.30 miles; Edenborn to New Orleans, 58.00 miles; total	129.30
Mangam & Northeastern—Not specified	1.00
Opelousas Gulf & Northeastern—Melville southwest to Opelousas	23.00
St. Louis, Iron Mountain & Southern (Mo. Pac.)—From Arkansas-Louisiana state line to Calvit	29.58
Sibley Lake, Bistineau & Southern (S., A. & S.)—Extension south	1.00
New Orleans Great Northern—Bogue Chitto River to Louisiana-Mississippi state line, 26.00 miles; Rio Junction to Lawrence Creek, 18 miles; total	44.00
	333.84

MAINE.

Franklin & Megantic—Kingfield to Alder Stream	2.50
Schoodic Stream—Junction with Bangor & Aroostook to East Millinocket	8.00
Somerset—Landus to Kineo station on Moosehead Lake	33.00
Washington County—Woodland Junction to Woodland	1.21
	44.71

MASSACHUSETTS.

New York, New Haven & Hartford—West Roxbury to Needham Junction	4.50

MICHIGAN.

Boyne City, Gaylord & Alpena—Gaylord to Hallock	7.00
Manistee & Grand Rapids—Dighton to Marion	11.00
Munising—Little Lake to Princeton	6.80
	24.80

MINNESOTA.

Big Fork & Northern—Northouse to Big Falls	32.00
Duluth & Northern Minnesota—From North Branch Junction north to Schaff Lake	12.40
Duluth, Missabe & Northern—Coleraine Junction to Coleraine, 53.00 miles; Burt mine to Winnifred mine, 1.00 mile; total	54.00
Duluth, Rainy Lake & Winnipeg—Ashawa to mile post 50	22.00
Eastern of Minnesota—Net increase in mining spurs	5.67
Minneapolis & Rainy River—Marcell Junction to Big Fork	12.00
	138.07

MISSISSIPPI.

Delta Southern (Southern)—Extension of Stoneville branch from Percy through Delta City to Richey, 11.18 miles; Elizabeth to Napanee, 6.06 miles; new branch on Birmingham division from Itta Bena to Belzoni, 26.8 miles; total	44.04
Gulf & Ship Island—Columbia division, from a point eight miles south of Silver Creek to three miles north of Columbia	16.50
Liberty White—McComb to Habnesville	10.00
Mississippi Central—From a point 7.50 miles west of Silver Creek to Brookhaven, 21.50 miles; Hattiesburg towards Scranton, 10.00 miles; total	31.50
Natchez, Columbia & Mobile—Divide to Loweton	3.50
New Orleans & Great Northern—Louisiana-Mississippi state line to Mays Creek	14.00
Southern—Extension from Vardeman to Derma	8.90
Yazoo & Mississippi Valley—From 10 miles beyond Silver City to Holly Bluff, 17.70 miles; from a point one mile beyond Webb to Parchman, 10.70 miles; Helm northeasterly, 0.90 mile; Stoneville easterly, 4.10 miles; Hendon across state farm, 3.30 miles; total	36.70
	165.14

MISSOURI.

St. Louis & San Francisco—Winkler to De Camp	6.50
St. Louis Belt & Terminal—Easton avenue to Hanly road, St. Louis	8.00
Sligo Furnace—Dillard to Bixby	10.00
Versailles & Sedalia—Versailles to mines	5.00
	29.50

MONTANA.

Yellowstone Park—Bridger to coal mines, 22.00 miles; spur lines, 4.00 miles; total	26.00

NEBRASKA.

Chicago, St. Paul, Minneapolis & Omaha (C. & N.-W.)—Hartington to Crofton	15.30
Sioux City & Western (Gt. No. and C. B. & Q. connection)—Between Sioux City and Ashland	85.00
Union Pacific—Stromsburg to Hordville, 17.00 miles; O'Fallons to Lewellen, 57.25 miles; total	74.25
	174.55

NEVADA.

Barnwell & Searchlight (A. T. & S. F.)—California-Nevada state line north	20.24
Nevada & California (So. Pac.)—Between Hazen and Fallon	14.81
Las Vegas & Tonopah—Las Vegas to Rhyolite	123.00
Nevada Northern—Between Cobre and Ely	124.00
	282.05

NEW JERSEY.

West Jersey & Seashore (Penn.)—Cape May division	2.67

NEW MEXICO.

Eastern of New Mexico (A. T. & S. F.)—Between Belen and Texico	71.00
St. Louis, Rocky Mountain & Pacific—Ute Park east to Cimarron, 13.00 miles; Cimarron to Raton, 47.00 miles; Clifton House east to end of track, 17.00 miles; Koehler Junction to Koehler, 3.00 miles; total	80.00
	151.00

NEW YORK.

Buffalo & Susquehanna—Between Arcade and Buffalo	40.00
Delaware & Eastern—Union Grove to east branch, 27.52 miles; Andes Junction to Andes, 8.50 miles; total	36.02
New York, Auburn & Lansing—Auburn to Genoa	19.00
	95.02

NORTH CAROLINA.

Atlantic & North Carolina (Nor. & So.)—Moorehead City to Beaufort	4.00
Raleigh & Southport—Bunnlevel to Fayetteville	23.00
South & Western—Spruce Pine to Altapass	5.00
Tennessee & North Carolina—Waterville to Mt. Sterling	2.00
	34.00

NORTH DAKOTA.

Dakota & Great Northern (Gt. No.)—Berthold-Crosby line, 27.58 miles; Aneta to Devils Lake, 58.62 miles; connection with Midland of Manitoba at Neche, 0.64 mile; Schurmeier cut-off, 4.52 miles; Thorne to Dunseith, 7.61 miles; total	98.97
Minneapolis, St. Paul & Sault Ste. Marie—Drake to Plaza, 97.50 miles; Flaxton to Ambrose, 51.00 miles; total	148.50
	247.47

OHIO.

Felicity & Bethel—Felicity to Bethel	9.00
Lorain & Ashland—Wellington to Lorain	22.00
Lorain & West Virginia (W. & L. E.)—Between Lorain and Wellington	15.00
Sugar Creek & Northern (W. & L. E.)—Between Bolivar and Orrville	15.00
	61.00

OKLAHOMA TERRITORY.

Kansas City, Mexico & Orient—Custer City to Clinton	13.00
Midland Valley—Foraker to Oklahoma-Kansas state line	23.00
	36.00

OREGON.

Astoria & Columbia River—Seaside to Cortwright Park	2.00
Central of Oregon—Union Junction toward Con	6.73
Oregon & Southeastern—Mile post 18 to mile post 20	2.00
Oregon Railroad & Navigation—Elgin toward Joseph	9.25
Oregon Western (So. Pac.)—Drain toward Marshalfield	20.00
Pacific Railway & Navigation—Hillsboro to mile post 20	20.00
Southern Pacific—Springfield to Henderson	1.13
	61.11

PENNSYLVANIA.

Columbus & Erie (Erie)—Columbus east	2.50
Huntingdon & Broad Top Mountain—Six-Mile Run branch from Riddlesburg to Coaldale	2.00
Ironton—West Coplay to Catasauqua, 2.00 miles; Reliance extension, .50 mile; Ironton extension, .50 mile; total	3.00
Jersey Shore & Antes Fort—Jersey Shore to Nippano	4.50
Monongahela Southern—Bull Run to connection with West side Belt	4.00
New Park & Fawn Grove (Stewartstown)—Between Stewartstown and Fawn Grove	7.00
Pennsylvania—Glen Loch to Thorndale, 10.24 miles; Parkersburg to Shocks Mills, 45.50 miles; South Fork branch at South Fork, 2.00 miles; between Pittsburg and West Brownsville, .23 miles; total	57.97
Pittsburg & Cross Creek (W. P. T.)—Avella up north fork of Coal Creek	3.00
Pittsburg, Summerville & Clarion—Extension of Brush Run branch	1.00
St. Mary's & Western—St. Mary's to Front Run	10.00
Susquehanna & Eagles Mere—Masten to Hillsgrove	10.00
Thompson's Run branch (W. P. T.)—From West Side Belt at Longview to Monongahela Southern at Mifflin	3.50
Western Allegheny (B. & L. E.)—Grant City to East Newcastle	8.50
West Side Belt—Extension from Clairton	.75
	117.72

SOUTH CAROLINA.

Chesterfield & Lancaster—Ruby to Pageland	15.00
Eddy Lake & Northern—Eddy Lake to Brown Swamp	15.00
Seaboard Air Line—From Catawba Valley Railway to Harmony Junction	11.00
	41.00

SOUTH DAKOTA.

Chicago, Milwaukee & St. Paul—Saranac to Renner, 21.74 miles; Glenham to a point west of the Missouri River, 39.00 miles; total	60.74
Minnesota, Dakota & Pacific (Minn. & St. L.)—Watertown to Leola, 114.29 miles; Conde to Northville, 23.60 miles; total	137.89
Missouri River & Northwestern—Between Rapid City and Mystic	15.00
Pierre, Rapid City & North-Western (C. & N.-W.)—Fort Pierre west to Midland, 49.00 miles; Rapid City east to Wasta, 43.32 miles; extension west from Bonesteel, 11.76 miles; total	104.08
South Dakota Central—Wentworth north to Rutland	6.20
White River Valley (C. M. & St. P.)—Presho to Stamford	64.32
	388.23

TENNESSEE.

Louisville & Nashville—Maryville spur, Armona to Maryville, 3.90 miles; Crooked Fork spur, Kilsyth to Roosevelt, 1.60 miles; total	5.50

*Change in location of old main line.

*Louisville & Nashville—Between Greenbrier and Tennessee-Kentucky state line	16.00
Overton County—Algood to Livingston	19.00
Tennessee—Buffalo Creek to Smoky Creek	14.00
Illinois Central—Woodstock to Leewood	7.50
Jackson Southeastern (Ill. Cent.)—Near Jackson	3.00
	65.00

TEXAS.

Abilene & Northern—Abilene to Stamford	38.81
Acme, Red River & Northern—Not specified	1.00
Beaumont & Great Northern—Trinity to Onalaska	19.50
Beaumont & Saratoga Transportation—Black Creek to 2 miles beyond Sour Lake Junction	8.00
Beaumont, Sour Lake & Western—Sour Lake to Trinity River	25.00
Burrs Ferry, Browndel & Chester—Rockland to Aldridge	7.70
Galveston, Harrisburg & San Antonio—Cuero to Stockdale	46.00
Houston & Texas Central—Nelleva to Mexia Junction	94.06
North & South Texas—Groveton northwest	2.00
Peach River & Gulf—Midline east	10.00
Pecos & Northern Texas (A., T. & S. F.)—Canyon City to Plainview	56.60
*Southern Kansas of Texas (A., T. & S. F.)—Glazier to Canadian	10.00
Texas & Gulf (A., T. & S. F.)—Boren spur	15.00
Texas Central—Stamford to terminus in Fisher County	42.00
Texas City Terminal—Texas City Junction to connection with G., C. & S. F.	1.30
Texas Southeastern—Neches River to Bilx	8.00
Wichita Valley (Colo. & So.)—Seymour to Stamford	60.70
Trinity & Brazos Valley (Colo. & So.)—Mexia to Belt Junction near Houston, 157.00 miles; Teague, towards Waxahatchie, 32.00 miles; total	189.00
	631.67

UTAH.

Oregon Short Line—Hot Springs to Union smelter, 1.20 miles; connection at Salt Lake City with S. P. L. A. & S. L., 1.02 miles; Wellsville branch, Wellsville to Mendon, 5.40 miles; Ogden cut-off, Ogden to Roy, 4.00 miles; total	11.62
Payette Valley—Payette to Plymouth	13.00
Rio Grande Western (D. & R. G.)—Revere to Bingham	10.00
Salt Lake & Ogden—Kaysville to Davis-Weber County line, 10.00 miles; in Ogden, 2.00 miles; total	12.00
*San Pedro, Los Angeles & Salt Lake—Near Trent	4.90
Western Pacific—Salt Lake City west to point on Great Salt Lake Desert	102.00
	153.52

VIRGINIA.

Blackstone & Lunenburg (N. & W.)—Blackstone to Dillard	5.52
Indian Creek & Pound River—Extension up north fork Pound river	5.00
New River, Holston & Western—Penvir to Boxley	4.00
Norfolk & Western—Speedwell extension between Cripple Creek and Speedwell, 5.28 miles; extension of Big Creek branch between Richlands and coal mines in Tazewell County, 1.18 miles; extension of Coal Creek branch in Tazewell County, .29 mile; total.	6.75
Tidewater—Sewells Point to mile post 100	100.00
	121.27

WASHINGTON.

Northern Pacific—Toppenish, through Sunnyside	17.39
Oregon, Washington & Idaho (O. R. & N.)—Riparia towards Lewiston, Idaho	34.36
Spokane International—Idaho-Washington state line to Spokane	19.00
Tacoma Eastern—Watkins east, 5.60 miles; East Creek Junction to Ladd, 1.90 miles; total	7.50
Washington & Great Northern (Gt. Nor.)—Between International boundary near Molson, B. C., to boundary north of Oroville, Wash.	24.81
	103.06

WEST VIRGINIA.

Buffalo Creek & Gauley—Clay east	3.00
Chesapeake & Ohio—Leewood to Lawson, 17.70 miles; Dingess run to Ethel, 3.40 miles; total	21.10
Deepwater—Jenny Gap to Micajah	26.00
Iaeger & Southern (N. & W.)—Ritter to mouth of Canebrake Creek	24.53
Norfolk & Western—Extension of Clear Fork branch above Coalwood to mines, 1.27 miles; extension of Sand Lick branch, 0.09 mile; extension of Lick Fork branch, 2.79 miles; total	4.15
	78.78

WISCONSIN.

Chicago & North-Western—Between Manitowoc and Green Bay, 18.07 miles; Pulaski to Eland Junction, 48.78 miles; between Duck Creek and Gillett, 28.66 miles; total	95.51
Chicago, Milwaukee & St. Paul—McGinnis spur to Klanke's spur	0.53
Chippewa Valley & Northern—Not specified	5.00
Fairchild & Northeastern—Bright to Owen	5.00
Wisconsin & Northern—Shawano to Norway Dam, 23.00 miles; Crandon to conection with Minneapolis, St. Paul & Sault Ste. Marie, 7.00 miles; total	30.00
	141.84

WYOMING.

Chicago, Burlington & Quincy—Frannie south to Worland	91.00
Union Pacific—Thayer to Superior	9.06
Wyoming & North-Western (C. & N.-W.)—Natrona to Lander	106.89
	206.95

CANADA.

Brandon, Saskatchewan & Hudson's Bay (Gt. Nor.)—From International boundary to Brandon, Man.	69.45
Canadian Northern—Ridgeville section, from South Junction, Man., west to Emerson Junction, 23 miles; Thunderhill branch, from Thunderhill Junction, Man., west to a point 1.3 miles beyond Benito, 20.1 miles; Melford, Sask., to Prince Albert, 62.40 miles; extension towards Hudson Bay, and lines not specified, 77.50 miles; total	183.00
Canadian Northern Ontario (Can. Nor.)—Toronto to Parry Sound	149.00
Canadian Pacific—Highlands to Canada Sugar Refinery, Montreal, 6.00 miles; West Selkirk branch, Winnipeg Beach to Gimli, 9.40 miles; Teuton to Komarno, 8.00 miles; Wolseley-Reston branch, mile post 60 to mile post 122, 62.00 miles; Strassburg north, mile post 202 to mile post 219, 17.00 miles; Pleasant Hills branch, west, mile post 345 to mile post 360, 15.00 miles; Moose Jaw north, 17.00 miles; Wetaskiwin branch, east mile post 50, to mile post 96, 46.00 miles; Nipissing Junction to Temaganei Company's mills, 3.00 miles; Staynerville to Bruners Quarry, 4.00 miles; Guelph to Milverton, 28.50 miles; Bolton Junction to Craighurst, 51.70 miles; total	267.60
Central Ontario—Bancroft, Ont., to one mile north of Bird's Creek	4.00
Halifax & Southwestern—Liverpool, N. S., to Barrington Passage, 84.00 miles; Middletown to Victoria Beach, 40.00 miles; total	124.00
Intercolonial—North Sydney, N. S., to North Sydney Mines	2.50
Klondike Mines—Grand Forks, B. C., to Sulphur Springs	19.00
Midland of Manitoba (Gt. Nor.)—From International boundary to Portage la Prairie, Man.	77.01
Morrissey, Fernie and Michel—Extension to yards	0.75
Orford Mountain—Cotton Springs, Que., to Mansonville	7.00
Quebec Central—Beauceville, Que., to St. George	9.00
St. Maurice Valley—Three Rivers, Que., to Shawinigan Falls	20.85
Temiskaming & Northern Ontario—Boston, Ont., to McDougall's Chute	45.00
Vancouver, Victoria & Eastern (Gt. Nor.)—From Midway, B. C., to International boundary (near Molson, B. C.)	28.89
	1,007.05

MEXICO.

Cananea Consolidated Copper Company's Railway—Temosachic, State of Chihuahua, to San Pedro	32.00
Cananea, Yaqui River & Pacific—From a point 15 miles east of Empalme, State of Sonora, on the Sonora River, to Buena Vista, on the Yaqui River, 61.00 miles; branch from Corral towards Alamos, 15.00 miles; not specified, 8.00 miles; total	84.00
Inter-California (So. Pac.)—Calexico towards Yuma, Ariz	15.00
Kansas City, Mexico & Orient—Pichachic, state of Chihuahua, east 5.00 miles; Ataros to Aguatos, 28.00 miles; total	33.00
Linares & Gulf—Between Linares, State of Nueva Leon, and San Jose	32.00
Mexican Central—Saltillo, State of Coahuila, to Paredon	40.00
Panuco Mountain & Monclova—Monclova, State of Coahuila, to Panuco	45.50
Zitacuaro & Joconusco—Zitacuaro, State of Michoacan, to Galeras	15.00
	296.50

*Change in location of old main line.

Municipal Partnership Between Chicago and Its Street Railroads.

The Mayor of Chicago announces that the long pending negotiations between the city and the two big street railroad companies, the Chicago City and the Chicago Union Traction, have been settled, by a contract which will shortly be formaliy ratified, and by which the city is to receive a share of the profits of the operation of the lines. The total value of the existing properties of the companies has been agreed upon at about $50,000,000, and after paying 70 per cent. of the income for operating expenses and 5 per cent. on this 50 millions, the remainder is to be divided between the city and the companies, the city to receive 55 per cent. and the companies 45 per cent. The contract provides for the immediate expenditure of large sums for the improvement of the roads, including the substitution of electric traction for cables where cables are still in use. The newspapers estimate that the net profits during the coming year, to be divided between the city and the railroads, will be $2,300,000. This is based on the following figures:

Income of companies	$16,000,000
Seventy per cent. for operating expenses and taxes.	11,200,000
Thirty per cent. fixed charges and profits	4,800,000
Fixed charges—Five per cent. on $50,000,000	2,500,000
Remainder: Net profit for city and companies	2,300,000
City's share	1,265,000
Companies' shares	1,035,000

Mayor Dunne still hopes to see his municipal ownership scheme succeed, but evidently the question of raising the funds for that purpose is one that cannot be settled at present. The city still retains the right under the franchises to take over the companies' property at any time on six months' notice. The agreed valuations are more than 25 per cent. below those which had been fixed by the companies before the negotiations began. The city agrees to an increase in fixed charges when money shall be expended for improvements, and also to allow 5 per cent. brokerage to be paid for raising the money for the improvements. It is said that the needed improvements will cost not far from $40,000,000, and to this cost is to be added 10 per cent. for contractor's profit. Within a year the facilities of the companies are to be increased until the seating capacity of the cars aggregates twice that at the present time. If after twenty years the city does not acquire ownership of the lines it may grant the right to operate to any other company that shall purchase on the same terms as the city. A complete rehabilitation of its property is to be carried out within three years by each company. At least sixty miles of electric track will be rebuilt; new power houses will be built; car barns reconstructed; and the number of double-truck up-to-date cars is to be increased as rapidly as possible until the seating capacity is double what it is now.

All of the work of rehabilitation is to be carried out under the supervision of a board of three engineers, which will report the expenditures of the companies to the City Controller monthly. One engineer will be appointed by the city, another by the company, and the third by agreement. In case of disagreement the Appellate Court is to nominate the third engineer.

The two companies are to contribute not to exceed $5,000,000 toward the cost of building a subway for street cars and other traffic in the central business section of the city.

Twenty-one through routes, permitting a passenger to travel from one extreme part of the city to another on the same car for one fare, are to be established. Routes may be changed and new ones established by the City Council, the warrant therefor to be judged by the Board of Engineers.

Universal transfers are to be exchanged and honored by the two companies at all places where their lines cross or connect, except in the congested district.

The motive power is to be electricity throughout, and the Council may after three years require the companies to operate any line by the underground trolley.

Each company is to pave, clean and sprinkle the part of the street it occupies, and may be required for compensation to clean the whole street and run garbage cars.

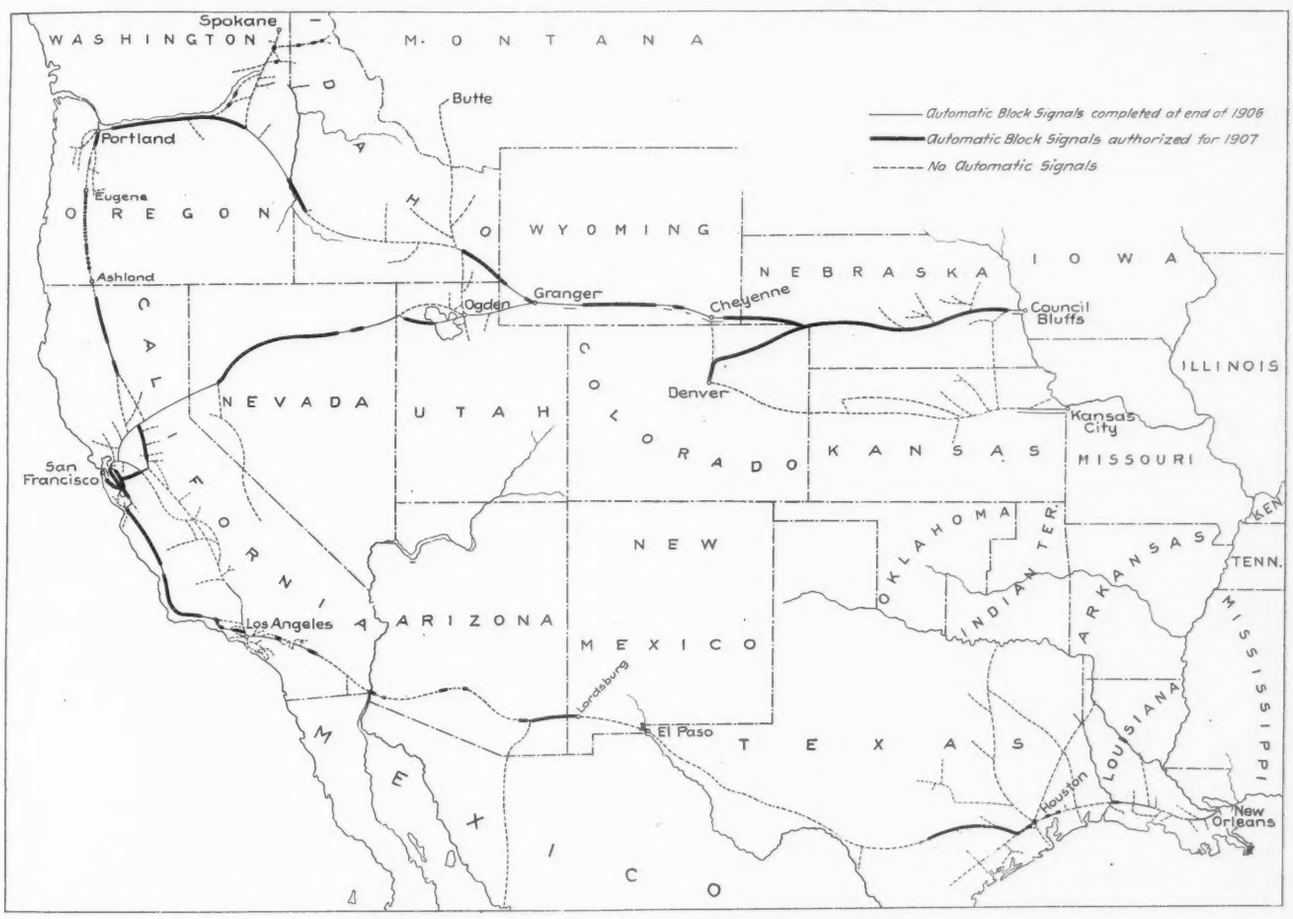
Only single cars are to be operated [no trailers].

Report on Grantham Derailment.

The British Board of Trade has issued its report on the derailment at Grantham on the night of September 19 last (*Railroad Gazette*, September 28), when the engineman, the fireman, a mail clerk and nine passengers were killed, and four employees and 15 passengers were injured, two of the passengers fatally; but the cause remains undiscovered. The report is by Lieutenant Colonel Von Donop. About the only features which he brings out beyond what was already known are (1) that the front and rear guards did not promptly discover that the train was approaching Grantham, where it was booked to stop, at a dangerous rate of speed and that, therefore, neither of these men was equal to his responsibilities; (2) that the engineman had been off duty, sick, on several occasions, under circumstances giving rise to a suspicion that he may have fallen sick at his post on the night of the disaster. The engineman having been off duty four weeks without the company knowing what was the matter with him, and without a medical examination when he returned to work, the company's methods are held to "call for revision." These are the only prominent criticisms in the report, though the fact that the wrecked cars, after falling down a bank, quickly took fire, is made the occasion to again declare that gas is not a suitable illuminant for railway vehicles. The train consisted of an engine and 12 cars. This engine had taken the train at Peterboro at 10:20 p. m., only 40 minutes before the wreck. It was a comparatively new engine, was in good order and had been run by this engineman a considerable time, and he had considered it a satisfactory engine. There is no doubt that the automatic vacuum brake was properly connected. This engineman had run this train before and had made the station stop at Grantham in proper fashion. There was a persistent story that the engineman had been intemperate, and the fireman, who had fired with him but a few times before, had said to a friend that he was nervous about running with him. But there is good evidence that the runner was sober on that night, and that he had not been addicted to over drinking; so the inspector concludes that this accident was not in any connected with any such cause. In short, the inspector concludes that both the engineman and the fireman were in every way competent to perform their duties. He finds it improbable that they forgot to stop at Grantham. It looks as though they did not realize how close they were to Grantham station; but the inquiries in this direction, including those concerning the possible sickness of the engineman, all end in mystery. The train was running about 50 miles an hour when it went off the track at the crossover, and it broke through a 4-ft. 9-in. parapet of a bridge (over which it was crossing). This parapet was 2 ft. thick for 21 in. up from the roadbed, 18 in. thick for 27 in., and then was surmounted by a coping stone 9 in. high and 18. in. wide.

Union and Southern Pacific Signal Scheme for 1907.

Mr. Kruttschnitt, Director of Maintenance and Operation of the Union Pacific, the Southern Pacific and their controlled lines, who has already taken everybody's breath away by his bold expenditures for automatic block signals, has laid out a scheme for the coming year which puts in the shade even his own remarkable record. The number of miles of line on which the block signal equipment is now completed is almost 2,000, but by the end of another year it is to be made almost 5,000, nearly all single track. The length of the road on which block signals are authorized to be installed during 1907 is



Automatic Block Signals, Built and to be Built—Union and Southern Pacific.

It will be seen that in another year block signal protection will be provided from Council Bluffs, Iowa, westward through Nebraska, Colorado, Wyoming, Utah, Nevada and California to Oakland, and southward from Oakland and San Francisco to Los Angeles; and then eastward to Pomona Junction. The main line of the Oregon Short Line from Granger, Wyo., northwestward, with its connection, the Oregon Railroad & Navigation Company, will be about two thirds signaled. The other principal sections to be equipped are those from Redding, Cal., northward; from Julesburg to Denver; from Houston, Tex., to Hilda, near San Antonio; and from Lordsburg, N. M., westward to Tucson, Ariz. Following are the total miles 2,846 miles, all, we believe, to be automatic semaphore signals. (These companies have very little non-automatic block signaling.) We print herewith a map of the company's lines, on which are shown the sections of road now equipped with automatic block signals, and the sections to be equipped during the coming year. On the line between Ashland, Oregon, and Eugene, a large number of automatic signals are to be erected at curves or stations, leaving the intervening portions of the line to be equipped afterward. This is shown indistinctly on the map.

signaled and to be signaled on the different railroads in the system:

Railroads.	Miles of Automatic Signals. Completed in 1906.	Authorized for 1907.
Union Pacific	372.07*	798.0
Oregon Short Line	486.90	249.0
Oregon R. R. & Navigation Co.	186.10	224.2
Southern Pacific: Pacific system	691.43†	1,292.4
Southern Pacific: Atlantic system	209.75	282.0
Total	1,946.25	2,845.6

*Includes 212.06 miles double track.
†Includes 97 miles electric train staff.

Important Changes in Railroad Officers in 1906.

The following list of official changes during the past year is not intended to be complete, but to show the more important executive appointments. A similar list was published in the *Railroad Gazette* of December 29, 1905.

Atchison, Topeka & Santa Fe.

May—Victor Morawetz, Chairman of the Executive Committee and General Counsel, resigned as General Counsel.

—W. D. Hines, formerly Vice-President and General Counsel of the Louisville & Nashville, appointed General Counsel.

August—James Dun, Chief Engineer of the Atchison, Topeka & Santa Fe System, appointed Consulting Engineer of System.

—W. B. Storey, Chief Engineer of the Atchison, Topeka & Santa Fe Railroad, appointed Chief Engineer of the Atchison, Topeka & Santa Fe System.

—H. C. Phillips, Chief Engineer of the San Francisco & North-Western, appointed Chief Engineer of A., T. & S. F. Coast Lines.

Atlantic Coast Line.

January—H. M. Emerson, Traffic Manager, appointed General Traffic Manager.

September—Alexander Hamilton appointed General Counsel.

Bangor & Aroostook.

December—Percy R. Todd, formerly First Vice-President of the N. Y., N. H. & H., elected Vice-President of the Bangor & Aroostook, effective January 1, 1907.

Boston & Maine.

September—D. W. Sanborn, General Superintendent, retired.

—C. E. Lee, Assistant General Manager, appointed General Superintendent.

Buffalo, Rochester & Pittsburg.

June—W. T. Noonan, General Superintendent, appointed General Manager.

Canadian Pacific.

February—W. F. Tye, Chief Engineer, resigned.

Central of Georgia.

March—J. T. Johnson, General Superintendent of Transportation, appointed General Superintendent.

June—H. M. Steele, Chief Engineer, resigned.

—C. K. Lawrence, Engineer of Construction, appointed Chief Engineer.

December—W. E. Chester, General Master Mechanic, resigned and office abolished.

—F. F. Gaines, Mechanical Engineer of the Philadelphia & Reading, appointed Superintendent of Motive Power of the Central of Georgia.

Chicago & Alton.

January—G. H. Kimball, Chief Engineer, resigned.

—W. D. Taylor appointed Chief Engineer.

October—B. F. Yoakum elected Chairman of the Executive Committee.

—Robert Mather appointed General Counsel.

Chicago & Eastern Illinois.

November—H. I. Miller, General Manager, elected President.

—W. J. Jackson, General Superintendent, appointed General Manager.

Chicago & North-Western.

January—W. A. Gardner, General Manager, elected Vice-President in charge of operation and maintenance.

—R. H. Aishton, Assistant General Manager of the lines east of Missouri river, appointed General Manager.

July—R. H. Aishton, General Manager, appointed General Manager of the lines east of the Missouri river.

—G. F. Bidwell, Manager of the Nebraska & Wyoming division, appointed General Manager of the lines west of Missouri river.

December—Frank Walters, Assistant General Manager of the lines west of the Missouri river, appointed General Manager of the lines west of the Missouri river, succeeding G. F. Bidwell, resigned.

Chicago, Cincinnati & Louisville.

May—H. C. Starr, General Counsel, elected also Vice-President and a Director, succeeding H. A. Christy.

Chicago Great Western.

July—W. H. Chadbourn appointed Chief Engineer, succeeding A. Munster, resigned.

Chicago, Indianapolis & Louisville.

January—B. A. Taylor, Assistant to the President, appointed General Manager.

Cincinnati, Hamilton & Dayton.

March—A. C. Hinckley, General Master Mechanic, appointed Superintendent of Motive Power.

Cincinnati, New Orleans & Texas Pacific.

November—Horace Baker, General Superintendent of the Southern district of the Missouri Pacific, appointed General Manager of the C., N. O. & T. P., succeeding W. A. Garrett, resigned to go to the Seaboard Air Line.

Cleveland, Cincinnati, Chicago & St. Louis.

April—W. M. Duane, Superintendent of Construction, appointed Chief Engineer, succeeding G. W. Kittredge, transferred to the New York Central & Hudson River.

June—See New York Central Lines.

October—J. Q. Van Winkle, Assistant General Manager, appointed General Manager.

Colorado & Southern.

February—J. M. Herbert, First Vice-President, resigned.

Detroit, Toledo & Ironton.

September—R. K. Smith, General Manager, resigned.

October—G. K. Lowell, General Superintendent of the Chicago, Indianapolis & Louisville, appointed General Manager of the D., T. & I.

El Paso & Southwestern.

August—T. Shumacker appointed Traffic Manager.

Great Northern of Canada.

February—F. Nicholls elected First Vice-President, succeeding James McNaught.

Gulf, Colorado & Santa Fe.

July—F. G. Pettibone, General Superintendent, elected Second Vice-President and General Manager, succeeding W. C. Nixon, resigned to go to the St. Louis & San Francisco.

Illinois Central.

November—J. T. Harahan, Second Vice-President, elected President, succeeding Stuyvesant Fish.

—J. F. Titus, Local Treasurer at Chicago, appointed Assistant to the President in charge of the accounting and treasury departments, succeeding to the duties of J. C. Welling, Vice-President, deceased.

International & Great Northern.

June—F. Hufsmith, Superintendent of Motive Power and Rolling Stock, resigned.

—G. S. Hunter, General Foreman, appointed Master Mechanic, succeeding to the duties of Supt. of M. P. and R. S.

Interstate Commerce Commission.

July—Nomination of F. K. Lane, of California, succeeding J. W. Fifer, confirmed by the Senate.

—E. E. Clark, Grand Chief of the Order of Railway Conductors, nominated as Commissioner, according to provision of the Hepburn law for two additional Commissioners.

August—J. C. Harlan nominated as Commissioner, making the Board complete.

Kansas City Southern.

June—Hermann Sielcken, Chairman of the Executive Committee, elected Chairman of the Board.

—L. F. Loree, formerly President of the Rock Island Company, elected Chairman of the Executive Committee and a Director.

December—E. F. Cost, Second Vice-President and Traffic Manager of the Seaboard Air Line, elected Vice-President of the Kansas City Southern in charge of traffic.

Lake Shore & Michigan Southern.

February—W. H. Marshall, General Manager, resigned to become President of the American Locomotive Company.

—E. A. Handy, Assistant General Manager, appointed General Manager.

June—H. F. Ball, Superintendent of Motive Power, resigned to go to the American Locomotive Company.

July—LeGrand Parrish, Assistant Superintendent of Motive Power, appointed Supt. of M. P.

Lehigh Valley.

March—J. A. Middleton, First Vice-President, put in charge of the operating department.

—T. N. Jarvis, Freight Traffic Manager, elected Second Vice-President in charge of traffic.

June—A. E. Mitchell, Superintendent of Motive Power, resigned.

—F. N. Hibbits, Mechanical Engineer of the N. Y., N. H. & H., appointed Supt. of M. P. of the Lehigh Valley.

Long Island.

June—G. C. Bishop appointed Superintendent of Motive Power and Equipment, succeeding Phillip Wallis.

—D. C. Green, Assistant Secretary, elected Vice-President.

Mexican Central.

November—A. A. Robinson, President, resigned.

—Eben Richards, Vice-President and General Counsel, elected Acting President.

Missouri, Kansas & Texas.

June—A. H. Joline, Counsel, elected Chairman of the Board, succeeding H. C. Rouse, deceased.

November—A. H. Joline elected President, succeeding F. N. Finney, resigned.

Nashville, Chattanooga & St. Louis.

February—E. C. Lewis elected Acting President, succeeding J. W. Thomas, deceased.

March—John W. Thomas elected President and General Manager.

—H. F. Smith elected Vice-President and General Traffic Manager.

—E. C. Lewis elected Chairman of the Board.

National of Mexico.

January—W. B. Ryan, Traffic Manager, resigned.

April—J. M. Reid, Chief Engineer of Construction, appointed Chief Engineer, succeeding R. T. Macdonald, resigned.

July—James Farrel, Acting Superintendent of Motive Power and Machinery, appointed Supt. of M. P. and Machinery.

October—M. J. Schneider appointed Superintendent of Motive Power and Machinery.

New York Central & Hudson River.

April—G. W. Kittredge, Chief Engineer of the C., C., C. & St. L., appointed Chief Engineer of the N. Y. C. & H. R.

December—Nathan Guilford, Vice-President in charge of traffic, resigned.

New York Central Lines.

May—W. C. Brown, Vice-President in charge of operation, elected Senior Vice-President.

June—A. H. Smith, General Manager of the N. Y. C. & H. R., elected also Vice-President in charge of operation and maintenance of all lines east of Buffalo except the Rutland R. R.

—C. E. Schaff, General Manager of the C., C., C. & St. L., elected Vice-President in charge of operation and maintenance of the lines west of Buffalo.

December—G. J. Grammer, Vice-President in charge of the lines west of Buffalo, elected Vice-President in charge of freight traffic on all New York Central Lines, with office at Chicago, Ill.

—C. F. Daly, Passenger Traffic Manager of the N. Y. C. & H. R., elected Vice-President in charge of passenger traffic on all New York Central Lines, with office at New York.

—Ira A. Place, General Counsel of the N. Y. C. & H. R., elected Vice-President in charge of the Legal Department of the lines east of Buffalo.

—A. H. Harris, General Attorney of the N. Y. C. & H. R., elected Vice-President in charge of the Legal Department of the lines west of Buffalo.

New York, Chicago & St. Louis.

January—E. E. Hart, Engineer, appointed Chief Engineer.

—A. W. Johnston, General Superintendent, appointed General Manager.

New York, New Haven & Hartford.

June—F. T. Hyndman, General Master Mechanic, appointed Mechanical Superintendent, succeeding F. N. Hibbits, resigned to go to the Lehigh Valley.

November—T. E. Byrnes, Assistant to the President, elected First Vice-President, succeeding Percy R. Todd, resigned. See Bangor & Aroostook.

Norfolk & Southern.

February—R. E. L. Bunch, Traffic Manager of the Atlantic & North Carolina, appointed Traffic Manager of the Norfolk & Southern.

November—M. J. Perry, President, elected Chairman of the Board.

—F. S. Gannon, Vice-President, elected President.

Northern Pacific.

October—David Van Alstyne, Mechanical Superintendent, resigned to go to the American Locomotive Company.

—W. Moir, General Master Mechanic at Tacoma, Wash., appointed Mechanical Superintendent.

Pennsylvania.

March—W. H. Brown, Chief Engineer, retired.

—A. C. Shand, Assistant Chief Engineer, appointed Chief Engineer.

Pere Marquette.

January—A. Patriarche, Freight Traffic Manager, appointed General Traffic Manager.

February—J. F. Deimling appointed Chief Engineer, succeeding F. H. Alfred.

June—E. K. Woodward appointed Chief Engineer, succeeding J. F. Deimling, resigned.

Pittsburg & Lake Erie.

January—Authority of New York Central & Hudson River heads of departments extended over Pittsburg & Lake Erie.

—J. B. Yohe, General Superintendent, appointed General Manager.

Rock Island Company.

February—B. F. Yoakum elected Chairman of the Board, succeeding W. B. Leeds, resigned.

November—G. T. Boggs, Assistant Treasurer, elected Vice-President, Secretary and Treasurer.

St. Louis & San Francisco.

January—Authority of W. B. Biddle, Third Vice-President in charge of traffic of the C., R. I. & P., extended over the St. L. & S. F.

July—W. C. Nixon, Second Vice-President and General Manager of the Gulf, Colorado & Santa Fe, elected General Manager of the St. L. & S. F.

November—W. C. Nixon, General Manager, elected also Vice-President.

San Antonio & Aransas Pass.

February—W. H. McIntyre elected President, succeeding C. R. Hudson.

—W. M. Hobbs, formerly Assistant to the Second Vice-President of the C., R. I. & P., elected First Vice-President and General Manager of the S. A. & A. P.

—M. D. Monserrate, Vice-President and General Manager, elected Second Vice-President.

San Pedro, Los Angeles & Salt Lake.

December—F. W. Wann, formerly Vice-President of the C., H. & D., appointed General Traffic Manager of the S. P., L. A. & S. L.

Seaboard Air Line.

April—Alfred Walter, Chairman of the Board of the South & Western, elected President of the S. A. L., succeeding J. M. Barr, resigned.

November—W. A. Garrett, General Manager of the C., N. O. & T. P., elected First Vice-President of the S. A. L.

December—Alfred Walter, President, elected Chairman of the Executive Committee.

—E. F. Cost, Second Vice-President and Traffic Manager, resigned to go to the Kansas City Southern.

—L. Sevier, General Freight Agent of the Alabama Great Southern, elected Second Vice-President and Traffic Manager of the S. A. L.

Southern.

November—H. B. Spencer, General Manager, elected Sixth Vice-President.

—C. H. Ackert, Fourth Vice-President, appointed also General Manager.

December—W. W. Finley, Second Vice-President, elected President, succeeding Samuel Spencer, deceased.

—John M. Culp, Third Vice-President, elected Second Vice-President.

—C. H. Ackert, Fourth Vice-President, elected Third Vice-President.

—T. C. Powell, Fifth Vice-President, elected Fourth Vice-President.

—H. B. Spencer, Sixth Vice-President, elected Fifth Vice-President.

—Fairfax Harrison, Assistant to the President, elected Vice-President.

Wisconsin Central.

October—G. M. Cummings elected Chairman of the Board, succeeding W. L. Bull, resigned.

—W. A. Bradford, Jr., President of the C., C. & L., elected also President of the Wisconsin Central, succeeding W. A. Whitcomb.

—Howard Morris, Vice-President and General Counsel, resigned.

December—H. C. Starr, Vice-President and General Counsel of the C., C. & L., elected to the same position on the Wisconsin Central.

Rotary Snow Plows on the Denver, Northwestern & Pacific.

The rotary snow plow is a feature of equipment to which faith is pinned by every superintendent of a Rocky Mountain division, but it is doubtful if any other steam road in the West must of necessity rely so heavily upon this class of mechanical snow fighters as the Denver, Northwestern & Pacific, which has in its rolling stock the largest rotary in the world. The Moffat line climbs the Continental Divide just west of Denver and as may readily be imagined the operation of a railroad at an altitude of more than 11,000 ft. above sea level is, during the interval from October 15 to April 15, an undertaking of no mean proportions.

The investment of the Moffat road for rotary plows has been a heavy one, but the operating officials feel that such expenditure is justified if it save more than a proportionate outlay for snow sheds at a cost of $60 per ft. to say nothing of a considerable annual appropriation for repairs. The rotary which ranks as the largest in the world has a wheel or snow screw more than 12 ft. in diameter, equipped in the usual manner with knives for cutting the snow and ice and cone-shaped steel scoops for catching up the loosened material and carrying it around to the funnel through which it is expelled in an oblique direction. The wheel proper is enclosed in a metal hood.

Despite the exceptional size of this rotary, two locomotives provide sufficient power for its propulsion, in contrast to the old-time conditions in the Rockies when as many as seven locomotives were frequently required to force one of the old-fashioned "gougers" through the heavy drifts. The rotary is occasionally operated through barriers of light snow at a speed of twelve miles or more per hour, but when densely packed snow is encountered—mayhap encrusted with ice and with ice formation four or five inches thick scattered through it the speed is reduced to from three to six miles per hour. The wheel is operated, ordinarily, at a rate of from 150 to 250 revolutions per minute. One of the greatest benefits resultant from the introduction of rotary plows in the Rockies has been found in the reduction in the number of casualties among railroad men engaged in fighting the snow.

Rotary Snow Plow, Denver, Northwestern & Pacific.

Side View, Largest Rotary Snow Plow Ever Built.

Train Accidents in the United States in November.[1]

rc, 1st, 10 p.m., New York Central & Hudson River, Melrose, N. Y., a southbound express train moving slowly was run into at the rear by a following local passenger train, damaging the rear car of the express. Two passengers and one employee were slightly injured. Both trains were those of the New York, New Haven & Hartford which uses the New York Central tracks at this point. The local train had run at excessive speed past an automatic signal set against it.

†bc, 1st, Chicago, Milwaukee & St. Paul, Quinnesec Junction, Mich., butting collision during a dense fog between a train carrying workmen to a mine and a freight train. Of the 40 miners in the passenger train three were killed and ten were injured, and one trainman was killed.

xc, 1st, 2 a.m., St. Louis, Iron Mountain & Southern, Argenta, Ark., collision between passenger train No. 202 and a switching engine; one fireman killed, one engineman fatally injured.

unx, 1st, Illinois Central, Covington, Tenn., a work train was derailed and wrecked; one employee killed, two injured.

3d, 8 p.m., Chicago, Rock Island & Pacific, Ellsworth, Minn., passenger train No. 607 was derailed and two passenger cars were overturned and wrecked. The whole train was badly damaged. Sixteen passengers were injured. The reports indicate that the derailment was due to a loose or spread rail, caused perhaps by the softening of the roadbed by floods.

unx, 4th, New York Central & Hudson River, Rome, N. Y., a freight train was derailed at a frog and ran into a building near the track. The engineman and one brakeman were killed.

5th, 2 a.m., New York, Chicago & St. Louis, Fort Wayne, Ind., collision between passenger train No. 6 and an empty engine, the switching engine being on the main track in a dense fog without right. One employee was killed.

xc, 5th, 11 p.m., St. Louis & San Francisco, Monett, Mo., passenger train No. 12 collided with a switching engine, which was on a side track, but did not quite clear the main line, and the passenger engine was overturned. One engineman was killed.

unx, 5th, Southern Railway, Wolf Creek, N. C., a freight train was derailed and ten cars were wrecked; two trainmen were killed and one trainman and a tramp were injured.

xc, 6th, Detroit & Mackinaw, South Branch, Mich., a train consisting of an engine and a caboose collided with a freight car which had been left standing on the main track unattended; one man killed and another fatally injured.

xc, 6th, Baltimore & Ohio, Salt Springs, Ohio, passenger train No. 7 collided with a wrecking train; one engineman killed, two passengers and four trainmen injured.

rc, 7th, Cincinnati Northern, Rossville, Ohio, a wrecking train running at high speed ran into the rear of a preceding freight which had been stalled on a steep grade. One trainman was killed, four others injured.

xc, 7th, Pennsylvania road, West Morrisville, Pa., collision of freight trains; one engine overturned, engineman killed.

unf, 8th, Little Rock & Monroe, Haile, La., a mixed train was derailed by running over a cow, and the engine was overturned. The engineman and fireman were killed.

bc, 9th, Pennsylvania road, Liberty, Pa., butting collision of freight trains, wrecking the engines and knocking down a bridge on which they were at the moment of the collision. Thirty cars

[1] Accidents in which injuries are few or slight and the money loss is apparently small, will, as a rule, be omitted from this list. The official accident record, published by the Interstate Commerce Commission quarterly, is regularly reprinted in the *Railroad Gazette*. The classification of the accidents in the present list is indicated by the use of the following

ABBREVIATIONS.

rc	Rear collisions.
bc	Butting collisions.
xc	Miscellaneous collisions.
dr	Derailments; defects of roadway.
eq	Derailments; defects of equipment.
dn	Derailments; negligence in operating.
unf	Derailments; unforeseen obstruction.
unx	Derailments; unexplained.
o	Miscellaneous accidents.

An asterisk at the beginning of a paragraph indicates a wreck wholly or partly destroyed by fire; a dagger indicates an accident causing the death of one or more passengers.

fell, with one span of the bridge, to the bottom of the creek below. One engineman was killed and two other trainmen were injured.

dr, 9th, Baltimore & Ohio, Loveland, Ohio, a passenger train was derailed by spreading of rails, and one passenger car was overturned; one brakeman was killed and 11 passengers were injured, one of them fatally.

unx, 9th, Yazoo & Mississippi Valley, St. Francisville, La., a mixed train was derailed and two freight cars were ditched; two brakemen were killed.

rc, 10th, Atchison, Topeka & Santa Fe, Victorville, Cal., rear collision of freight trains; one brakeman killed.

dr, 10th, Illinois Central, Buckley, Ill., a passenger train was derailed by a broken rail, and 15 passengers and two trainmen were injured.

dn, 10th, Michigan Central, Detroit, Mich., a locomotive, deserted by the engineman and fireman at the approach of a train which seemed likely to collide with their engine, ran uncontrolled for some distance to the Third street passenger station, where it ran into the building, knocking down a part of the walls. One man was killed and three were injured.

xc, 11th, St. Louis & San Francisco, Fort Worth, Tex., collision between a passenger train and an empty engine; one fireman killed, four trainmen injured, one of them fatally.

unx, 11th, Missouri Pacific, Eureka, Mo., passenger train No. 4, running at high speed, was derailed at a curve, and all of the passenger cars were ditched; 12 passengers were seriously injured.

*†bc, 12th, 5 a.m., Baltimore & Ohio, Woodville, Ind., butting collision between a westbound passenger train and an eastbound freight, wrecking both engines and the front portions of both trains. The wreck was a very bad one and it took fire at once and burned fiercely. Forty-eight passengers were killed and 33 passengers and four employees were injured. The bodies of most of the passengers killed were burned beyond recognition. The freight train had stopped at Babcock to meet passenger train No. —, but through some mistake not yet fully explained was started eastward after the first section of the passenger train passed without waiting for the second, and it was with the second that it collided.

*xc, 12th, New York Central & Hudson River, Watertown, N. Y., collision between a freight train and a work train, wrecking both engines and several cars. The wreck took fire and was partly burned up. Four employees were injured.

dn, 12th, Southern Railway, Waco, Ga., fast mail train No. 97 was derailed at a misplaced switch. Engine and car were wrecked.

o, 12th, Southern Pacific, Sargents, Cal., the locomotive of a passenger train was wrecked by the explosion of its boiler. The first four cars of the train were overturned, and the station building, opposite which the explosion occurred, was wrecked. The engineman and one other employee were killed and the fireman was fatally injured.

xc, 13th, 4 a.m., Chattanooga, Tenn., a locomotive of the C., N. O. & T. P. collided with a locomotive of the Belt Line at a crossing of the two roads. One trainman killed and two injured.

unx, 13th, Missouri Pacific, Glencoe, Mo., a passenger train running at full speed was derailed and all of the cars were ditched, but the passengers and trainmen all escaped with very slight injuries.

unf, 13th, Pittsburg & Lake Erie, Edensburg, Pa., a passenger train was derailed by a wagon load of logs at a crossing of the road. The engine and first four cars were wrecked. The engineman, fireman and baggageman were injured, the first two fatally.

rc, 14th, Nashville, Chattanooga & St. Louis, Wauhatchie, Tenn., rear collision of passenger trains. One car wrecked, several passengers injured.

unx, 14th, West Jersey & Seashore, Grassy Sound, N. J., a passenger train was derailed and the engine and first two cars fell off a bridge into a creek. Twelve passengers and two trainmen were injured, two of them fatally.

rc, 15th, 10 p.m., Philadelphia & Reading, Linfield, Pa., a passenger train ran into the rear of a preceding freight train. One employee killed, three injured. There was a blinding snowstorm at the time and the passenger train had already been once stopped on account of the presence of the freight train on the main line ahead of it.

xc, 15th, 9 p.m., Texas & Pacific, El Paso, Tex., collision of switching trains. One employee killed, two injured.

16th, Southern, Columbia, S. C., collision between a freight train and a work train. One trainman killed, six injured.

†*rc, 17th, Illinois Central, Ripley, Tenn., a train consisting of an engine and a caboose ran into the rear of a preceding local freight train, wrecking the caboose of the freight and several cars. The wreck took fire and was mostly burned up. Two passengers in the freight and a flag man of the same train were killed, and three passengers were injured.

bc, 16th, 5 a.m., Chicago & North-Western, West Chicago, Ill., butting collision of freight trains in the yard, making a bad wreck. One fireman was killed and one engineman fatally injured. Both engines and 15 cars were wrecked. The wreck was due, it is said, to a misplaced switch.

dr, 17th, Atlantic Coast Line, Leland, N. C., a passenger train was derailed by a broken rail and 17 passengers were injured.

rc, 18th, Chicago, Milwaukee & St. Paul, Riverside Park, Ill., rear collision of freight trains. One trainman killed, three injured.

xc, 18th, Delaware, Lackawanna & Western, Lehigh, Pa., a locomotive backed from a side track into a passenger train, badly damaging three engines and two milk cars. One engineman was killed and five freight trainmen were injured, one of them fatally.

dr, 18th, St. Louis & San Francisco, Powers, Ark., three cars of a freight train were derailed at a point where the track had been weakened by heavy rain and one brakeman was killed.

dn, 18th, Colorado & Southern, Buena Vista, Colo., a freight train became uncontrollable on a steep grade and was derailed at a curve. Two trainmen killed and one fatally injured.

dn, 19th, 5 a.m., Baltimore & Ohio, Taylorstown, Pa., a freight train, while switching, ran over a misplaced switch and off the end of the track, the engine falling down a bank; one brakeman was killed.

dn, 19th, Southern Railway, Old Fort, N. C., a freight train descending a steep grade became uncontrollable and after running 10 miles at high speed was derailed at a curve; two trainmen were killed and three injured.

bc, 20th, 10 p.m., Mobile & Ohio, Dwight, Ala., a northbound passenger train standing on a side track was run into by a southbound passenger train, badly damaging both engines. It is said that a brakeman became confused and misplaced a switch immediately in front of the moving train. Twenty-five persons were slightly injured.

bc, 20th, 10 p.m., Richmond, Fredericksburg & Potomac, Cherry Hill, Va., butting collision of freight trains, badly damaging both engines and several cars; one trainman and one trespasser were killed and three trainmen were injured.

dr, 20th, St. Louis & San Francisco, Powers, Ark., a freight train was derailed at a point where the track had been damaged by rain, and one brakeman was killed.

dr, 20th, Great Northern, Grand Harbor, N. Dak., passenger train No. 3 was derailed by spreading of rails and the engine and first four cars were overturned. Two mail clerks and several passengers were injured, the mail clerks severely.

unx, 20th, Louisville & Nashville, Cane Creek, Ala., a freight train was derailed; engineman killed, four trainmen injured.

rc, 21st, Atlantic Coast Line, Waycross, Ga., rear collision of freight trains, six trainmen injured.

unx, 21st, Buffalo, Rochester & Pittsburg, Colden, N. Y., a passenger train was derailed and three cars were ditched; 10 persons injured.

bc, 21st, Atchison, Topeka & Santa Fe, Hilton, Colo., butting collision of passenger trains, wrecking both engines and one mail car. One fireman was killed and five passengers were injured, two probably fatally.

unx, 21st, Chicago & North-Western, Sterling, Ill., a freight train was derailed and four trainmen were injured, one of them probably fatally.

xc, 22d, New York Central & Hudson River, Corning, N. Y., collision between a freight train and an empty engine, wrecking the engines and 10 cars, most of the wreck falling down a bank into Chemung river. One engineman and one brakeman were killed.

dr, 22d, Great Northern, Dohon, N. Dak., a passenger train was derailed by spreading of rails and the engine and first two cars were wrecked; three trainmen were killed, and two mail clerks and three passengers were injured.

unx, 23d, Fort Worth & Denver City, Amarillo, Tex., passenger train No. 1 was derailed and ditched and six passengers were injured. The train was 70 hours late and had been derailed once before on the same trip.

†xc, 26th, Wisconsin Central, Stanley, Wis., a freight train standing on a side track, but not fully clear of the main track, was run into at the rear by a following freight, and of the 12 passengers in the caboose of the standing train two were killed and a third was injured, probably fatally.

bc, 27th, 7 p.m., Southern Railway, Winona, Miss., westbound passenger train No. 35 ran over a misplaced switch and into the head of a freight train standing on the side track, wrecking both engines. One employee was killed and three trainmen and six passengers were injured.

bc, 28th, 5 a.m., Central of Georgia, Bolingbroke, Ga., butting collision of freight trains; six trainmen injured.

rc, 29th, 6 a.m., Southern Railway, near Lawyer, Va., southbound passenger train No. 33, which had been stopped by the failure of a coupling, was run into at the rear by passenger train No. 37 following, wrecking the rear car of No. 33, which was the private car of the President of the road, Mr. Samuel Spencer. Mr. Spencer, three of his guests and three employees were killed, and seven passengers and there employees were injurd. This division of the road is worked by the telegraph block system and the collision occurred between Rangoon and Lawyer. Train No. 33 left Rangoon at 6.06 a.m., but was not announced to Lawyer. When train No. 37 ap-

proached Rangoon, the signalman asked Lawyer for a clear block, and Lawyer, not knowing that train No. 33 had been admitted, authorized the admission of train No. 37. The signalman at Rangoon, who is held responsible for sending train No. 33 forward without communicating with Lawyer, is 22 years old, and has been night signalman at that place for nearly two years. He is said to have had a good record. He worked 12 hours a night and received $50 a month. Train No. 33 is said to have been standing about three minutes at the time of the collision. The flagman says that he had gone back 900 ft. At the point of the collision the trains were on a 1 per cent. descending grade and train No. 37 was probably running — miles an hour. If the flagman was back 900 ft. his flag could have been seen about 1,500 ft. from the standing train. The coupler which failed had in it two 1⅛-in. nuts in place of a lock-block, which had been lost. At Lynchburg the coupler had failed, and after spending a half hour or more in trying to find a suitable block with which to repair it, the conductor used the nuts instead.

dr, 29th, Kansas City Southern, Shreveport, La., a freight train was derailed by spreading of rails and the engine and 15 cars were ditched. The engineman and fireman were injured.

rc, 30th, Louisville & Nashville, Castleberry, Ala., rear collision of freight trains; one trainman killed, four injured.

bc, 30th, 6 a.m., Central Vermont, Montville, Conn., a passenger train ran over a misplaced switch and into the head of a freight train standing on the side track; one fireman was killed and three other trainmen were injured.

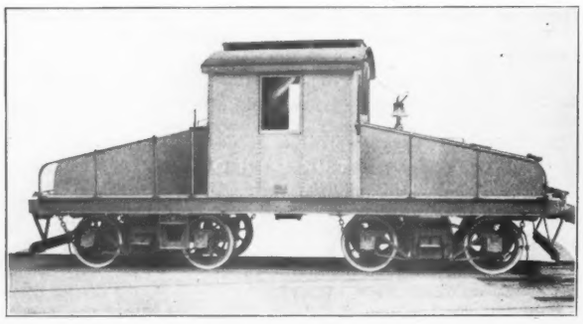
†xc, 30th, Bloomington, Ill., a freight train of the Chicago & Alton backed into a passenger train of the Lake Erie & Western, which was standing at the station, killing one passenger and injuring 14 others, two of them probably fatally.

xc, 30th, Wabash road, Ferguson, Mo., a passenger train ran into a freight train at a side track; one fireman was killed and one other trainman injured.

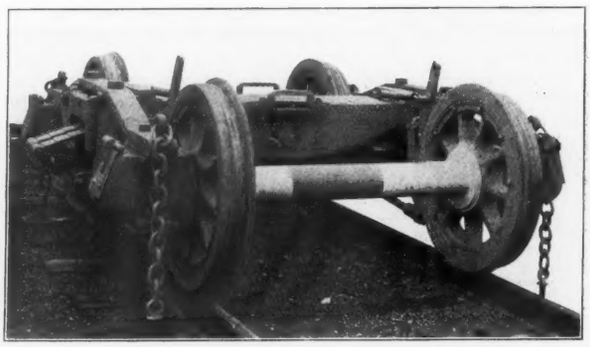
dr, 30th, Chicago, Rock Island & Pacific, Waukomis, Okla., passenger train No. 12 was derailed by spreading of rails and 10 passengers were injured.

Electric Locomotive for the General Electric Company.

The American Locomotive Co. has recently completed a 37½-ton electric switching locomotive for the General Electric Co. It is designed to operate on a 250-volt circuit and the maximum tractive effort is 15,000 lbs., though the instantaneous drawbar pull for starting purposes is 18,800 lbs. The machine is carried on two arch-bar trucks similar in general design to those ordinarily used under freight cars with inside hung brakes and cast bolsters. In order to accommodate the two 175 h.p. motors with which each truck is equipped the brake-beams are dispensed with and the levers are attached direct to the brake heads, as shown in the illustrations. The motors themselves are hung inside with a nose suspension on the bolster so that their weight is evenly divided between the axles and the truck frames.



Elevation; General Electric Locomotive.



General View of Truck.

This locomotive is arranged for a single unit control and is fitted with both trolley and third rail shoes. It is also fitted with the straight air-brake of the General Electric Co. and the Leach sander, operated by a single centrifugal pump air compressor. The platform and framing is of 10-in. steel channels and $^{3}/_{16}$-in. floor plates. The cab is of the steeple type and consists of one main cab and two auxiliary cabs.

Some of the principal dimensions of the locomotive are:

Length over all	31	ft. 1	in.
Width	9	" 6¼	"
Total wheel base	22	" 6	"
Driving wheel base	6	" 6	"
Height over cab	12	" 1¾	"
Height with trolley down	13	" 0	"
Truck wheels	36	in.	diameter

Foreign Railroad Notes.

The Borsig Locomotive Works of Berlin turned out its 6,000th locomotive Nov. 6. The 5,000th came out four years before; the 4,000th in 1886.

The production of coal in Germany (the whole empire) has been vastly greater this year than ever before, for the nine months ending with September amounting to 185,045,000 short tons, which is 14½ per cent. more than last year for the same months. That the increase in iron production has had very much to do with this appears from the fact that the coke shipments increased more than 37 per cent.

The lower grades of the regular employees of the Wurtemberg State Railroads have petitioned for certain improvements in their social condition. The first point mentioned was that in addressing every employee of whatever grade his superior should prefix "Mr." to his name. The Minister in charge recommended that this be done in all written communications; for oral directions he wanted more time for consideration.

In Holland an apparatus has been introduced to register the actual speed of trains over bridges, past switches, on curves, and on other sections of track where the rules limit the speed. It is intended to measure actual maximum speed at any point on the section, not the average speed in passing the section, which may be (and often is) the average between a dangerous speed and one below that permissible.

A railroad was opened last October in German Southwest Africa from the sea at Lüderitz Bay, about 26½ south latitude, eastward 85 miles to Aus, where there is water and vegetation, the country nearer the coast being a desert. The road has been generally called the Lüderitz and Kubub Railroad, Kubub being a military station a few miles south of the present eastern terminus. It is intended eventually to extend this road further east about 170 miles to Keetmanshoop and to connect with the railroads in the British Cape Colony. Chief obstacles on the line now built were sand dunes, moving with the winds. At one time it was thought that it might be necessary to tunnel these.

The Saxon State Railroads have divided their workmen into 23 groups, according to occupation, each of which is to elect a committee of from 3 to 12 members as its representatives. It will be the duty of the committees to bring before the railroad authorities the wishes or complaints of the workmen, and, on request, to express their opinion on apparatus and rules for preventing accidents, or arrangements for the comfort and convenience of the men; further, to settle differences between the workmen themselves when appealed to by both parties. There has been heretofore an employees committee, but only one for the whole body of workmen.

The demand for cars, which is always in excess of the supply in the autumn months, in the principal European countries is greater than usual this year, and not only in Russia and Italy, where something like a blockade is expected at this season, but also in Germany, where great efforts have been made to anticipate the demand. On the Prussian State Railroads, which have long been very prosperous and can command the means for any additions thought necessary, and which have exceptional facilities for ascertaining the probable demand as anticipated by the shippers themselves, the latter ordered 3,384,186 cars during October last, while the railroads were able to furnish only 3,127,740, or 924 for every 1,000 ordered. The number of cars ordered was 7.4 per cent. more than last year, and the number furnished 8.2 per cent. greater. The growth of traffic has exceeded all calculations.

Annual Report of Interstate Commerce Commission.

From a synopsis of the twentieth annual report of the Interstate Commerce Commission, issued by the Secretary, we extract the principal paragraphs, as follows:

The most important legislation of the year relating to the work of the Commission was the passage of the amended act to regulate commerce.

The Commission does not present any recommendations for further amendments of the statute in this report, but amendments will be submitted in special communications to Congress during the present session.

The questions arising under the new legislation are numerous, and some of them extremely difficult. It has been necessary for the Commission to devote a considerable part of its time to an administrative construction of this law and the preparation of decisions and rulings as to its meaning and application. The nature and scope of these rulings and decisions are indicated in a summary printed as an appendix to the report. [These have been reported in the *Railroad Gazette* recently.] More than 600 applications for permission to make changes in rates on less than the statutory thirty days' notice have been received since August 28, the date when the new law became effective. The majority of these have been granted, as the reasons set forth seemed to amply justify the Commission in the exercise of this discretionary power. Almost without exception these applications have been to put in reduced rates, the necessity for which could not, owing to various emergencies, be foreseen in time to give the full thirty days' notice. The necessity of examining the tariffs on file in connection with these applications has added very largely to the work of the Commission. Contrary to general expectation, the requirement of thirty days' notice has operated to greatly increase the number of tariffs. Prior to the passage of the amending act, for several years, the average number of tariffs filed daily was about 450, including both freight and passenger tariffs, but from August 1, 1906, up to and including November 30, the average number of tariffs filed daily has been 964, and this number does not include express, pipe-line, or sleeping-car tariffs. On August 27, the day before the amended law became effective, the number of schedules received for filing was 5,587, of which 4,975 were freight and 612 were passenger tariffs.

The great number of tariffs received since and just prior to the taking effect of the amended law, and the limited clerical force available for the work, have rendered impracticable any detailed comparison of the rates shown in these tariffs compared with those previously in effect, but, from such examination as it has been possible to make, it appears that the great majority of the tariff changes have been reductions.

While the majority of tariffs on file are comparatively simple in arrangement and easily read, a great many are not arranged in such manner as to be readily understood by persons of ordinary intelligence, and in some cases they are so complicated that it is difficult for even an expert to determine the rates therefrom. The Commission intends at an early date to prescribe rules governing the construction and arrangement of tariffs.

Numerous hearings have been held in the investigation ordered by the joint resolution of Congress, relating to the relations of common carriers to the production and distribution of coal and oil and the ownership of coal and oil lands by such carriers or their officers and employees. A series of reports on this investigation will be made from time to time, the first of which, so far as coal is concerned, will pertain to what is called the Eastern bituminous situation, and that report will soon be submitted to the Congress. A special report upon that portion of the investigation which pertains to oil will soon be submitted.

A report to the Congress under the La Follette resolution of June 25, relating to the ownership and operation of elevators and practices in the handling of grain, is in course of preparation and will be submitted as soon as practicable.

Other special investigations, instituted by the Commission upon its own motion, relate to the relation between the Union Pacific and Southern Pacific Railway systems growing out of their combined management and control, the relations of the Northern Pacific, Great Northern and Burlington systems, with a view to ascertaining to what extent they are under unified control and the effect of any such control upon their rates and practices. A further inquiry has been instituted with reference to the prevailing car shortage, and is now proceeding in various parts of the country.

The inability of shippers to procure cars for the movement of their traffic is the subject of numerous and grievous complaints which come to the Commission from all parts of the country. The extraordinary prosperity which everywhere abounds, with the high prices obtainable for all classes of commodities, have so stimulated production as to yield a volume of transportation business which far exceeds in the aggregate the carrying capacity of the railroads. In a word, the development of private industry has of late been much more rapid than the increase of railroad equipment.

The conditions now existing in the Northwest, where large quantities of grain require immediate shipment, and in the Southwest and trans-Missouri region, where thousands and tens of thousands of live animals are denied movement to the consuming markets, may justly be regarded as alarming; while throughout the Middle West and Atlantic seaboard the shortage of cars for manufactured articles and miscellaneous merchandise has become a matter of serious concern. In some cases it is simply a lack of cars, in others insufficient tracks and motive power, in still others wholly inadequate freight yards and terminal facilities.

The larger roads are in many cases refusing to furnish cars for loading to points beyond their own rails, because they are not unloaded and returned within a reasonable time.

Subsequent to the last annual report to the Congress and prior to August 28, 1906, the date when the amended law became effective, the Commission rendered decisions in twenty-seven contested cases, which are summarized in the report. The decisions rendered in the United States courts during the year relating to the application of the act to regulate commerce are briefly stated. Twenty-one civil cases are pending in the courts for enforcement of the regulating statute. The fines imposed upon corporations and individuals in proceedings involving criminal violations amount to several hundred thousand dollars, and two persons were sentenced to imprisonment.

Under the twentieth section, as amended, the Commission is granted authority to prescribe a uniform system of accounts for railroads and other transportation agencies under its jurisdiction, and the Commission will take up and consider accounting methods in operating expenses, earnings and income; the proper method of treating terminal companies, arbitraries, absorbed switching charges, and the like; separation of repairs from betterments, so as to learn how far the improvement of property is charged to current earnings; a revision of the balance sheet, and a revision of the classification of construction accounts. Every person interested will have the opportunity of criticism and suggestion before the final form of accounting shall be determined upon. The new law places express companies, sleeping-car companies, pipe lines and electric lines under the jurisdiction of the Commission, and reports will be demanded from them.

[The advance report of the income account statement for operating railroad companies was given in the *Railroad Gazette* Nov. 30, 1906.]

The condition of safety appliances has continued favorable. Many old cars of light capacity have been retired from service and have been replaced by new cars of modern construction. This has had a good effect, as the new cars are all equipped with air brakes and have the latest couplers, which are stronger than those put in service a few years ago. There is also a tendency to limit the couplers used to four or five of the best makes, and this leads to uniformity and removes the necessity of keeping in stock a large number of repair parts.

A difficult problem connected with the coupler question is the matter of improper repair parts, leading to defects that cannot be discovered until an attempt is made to operate the coupler, when it is found inoperative. This leads to danger to employees and places carriers in the attitude of violators of law.

An amendment to the law is needed, placing all appliances included in the master car builders' standards for the protection of trainmen under the regulation of law, such as sill steps, ladders and roof handholds. Penalty defects are well looked after and properly repaired, but appliances not covered by the law are frequently allowed to pass in a defective condition. It is only by placing all these appliances in the same category that their safe and serviceable condition can be insisted upon at all times.

As a result of the Commission's order increasing the minimum percentage of power brakes to be used in trains, there has been a considerable increase in the use of air brakes. The operation of this order has been beneficial, and indications are that freight trains will soon be controlled wholly by means of air brakes.

Generally speaking, the coupler and brake law has been well observed, but there are carriers in all parts of the country that have been somewhat lax, and 225 suits have been filed for violation of the law since it went into effect, 100 of which have been settled, and penalties to the amount of $22,700 have been collected and turned into the treasury. Of the suits settled, 83 were disposed of by the carriers confessing judgment and paying the penalty. Seventeen have gone to trial, in 15 of which verdicts have been rendered in favor of the Government.

The only suits decided against the Government are two recent cases tried in the district court in Colorado. Should this interpretation of the law be sustained by a higher court, the statute will be greatly weakened. Notable decisions upholding the law were recently rendered by Judge McPherson, of the United States district court, at Des Moines, Iowa, and by Judge Whitson, at Spokane, Wash. Congress should provide for a considerable increase in the force of inspectors. The loss of life occasioned by the use of comparatively light postal cars demands attention, and Congress should take some action to the end that this danger may be obviated.

Railroads have now made monthly reports to the Commission

of accidents to passengers and employees for five years. The tremendous increase in the volume of freight traffic has put a severe strain upon employees, and this has often been made the justification of or excuse for working men unduly long hours, and has led to the employment of many young and inexperienced persons. In the matter of long hours the accident reports have shown instances of even worse conditions than existed in former years.

In the item of passengers killed in collisions and derailments, the record for 1906 is not so bad as that of 1905. This is a cause for gratification; but the only real indication of the figures is that the number and severity of great disasters has diminished. The cost of collisions as reported by the companies, excluding damages to property and indemnities paid to or on account of persons killed or injured, is $10,659,189, nearly a million dollars greater than in 1905.

The Accident Bulletins only serve to confirm the serious and pressing character of the threefold problem which has been made the chief feature of this department of the last two or three annual reports: (1) the investigation of accidents; (2) the requirement by law that the block system shall be used on passenger lines, and (3) the regulation by governmental authority of the evil of overwork by trainmen, signalmen and telegraph operators.

Acting under Public Resolution No. 46, the Commission, with the aid of experts, is engaged in an investigation of the use of and necessity for block signal systems and appliances for the automatic control of railroad trains. This information is being put in shape to be reported to Congress and will be shortly transmitted.

The Pennsylvania Tunnels Under the North River.

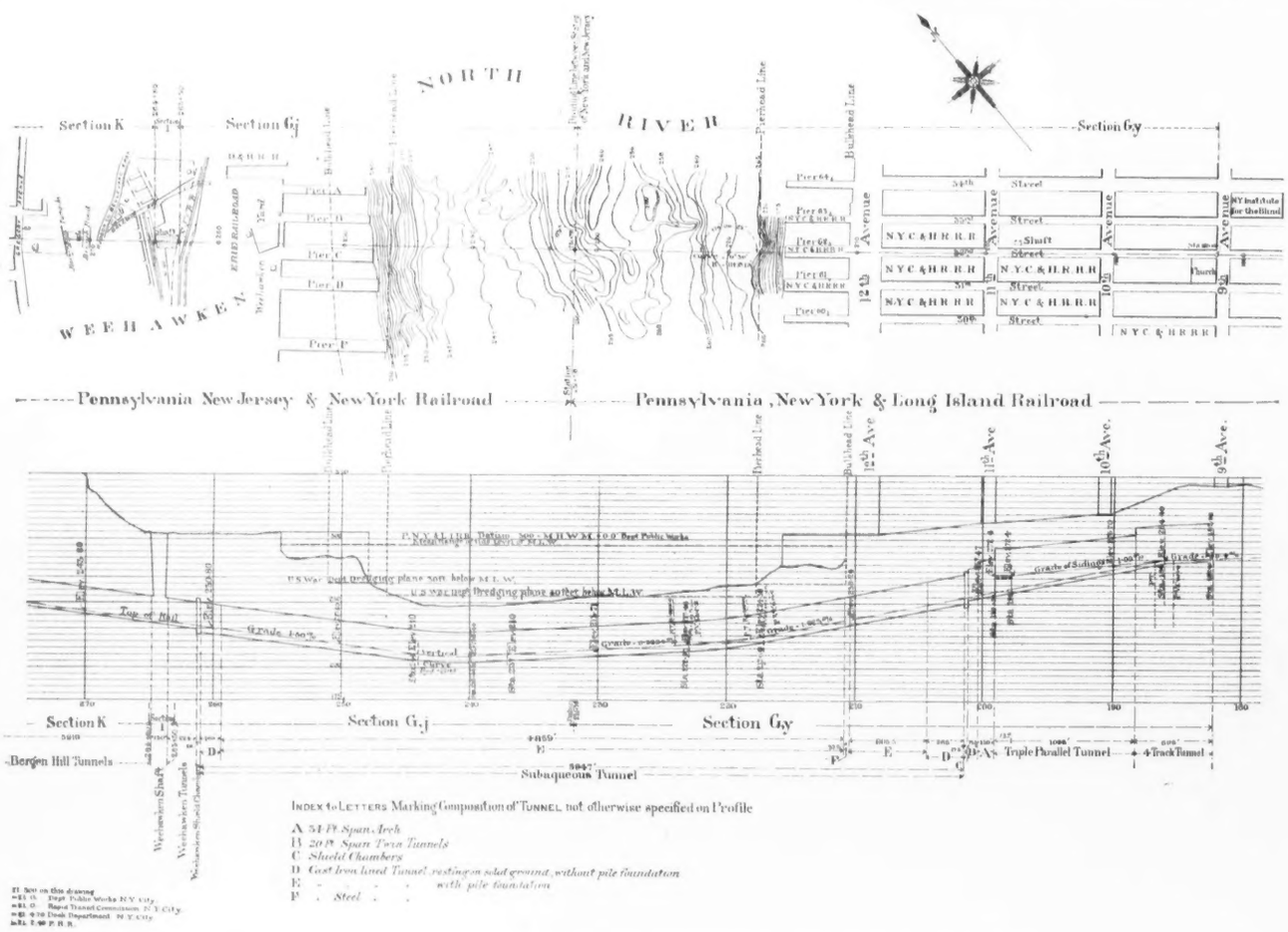
The entrance to the Pennsylvania Terminal Station in New York City from the south and west will be over a two-track detour line across the Hackensack meadows from a point on the main line near Harrison, just east of Newark, through two single-track tunnels in rock under Bergen Hill and Weehawken, and under the North river through two cast-iron lined tube tunnels which join the cut-and-cover excavation for the approach tracks to the station west of Tenth avenue on Manhattan island. The work naturally divides itself into three parts, the Bergen Hill tunnels in rock, the sub-aqueous river tunnels and the station approach from the river shaft to the Ninth avenue side of the station excavation.

The western portal of the Bergen Hill tunnels is about 700 ft. east of the tracks of the New York, Susquehanna & Western and the Northern Railroad of New Jersey (Erie). The approach is a 4 deg. curve on an embankment over the meadows with a plate girder bridge over the tracks of the two railroads which it crosses. One of the illustrations shows the approach looking west from the portal. The tunnels under Bergen Hill are parallel single-track bores 37 ft. center to center, and with a full circular arch of 9 ft. 6 in. radius inside. Between the west portal and the Weehawken shaft, a distance of 5,910 ft., the line is a tangent on a 1.3 per cent. descending grade toward the river. At the deepest point the crown of the tunnels is about 77 ft. below the surface.

The Weehawken shaft, in about 800 ft. from the river pierhead line, is a magnificent piece of concrete masonry. It is rectangular in shape at the bottom, 56 ft. by 116 ft. and 76 ft. deep. The original plans called for a concrete facing but on account of the bad rock encountered in going down the excavation was enlarged to allow for substantial face walls from 3 to 10 ft. thick on the sides stepped into the rock and anchored with bolts. The end walls have nearly a vertical back face and a front face with a batter of 1:3, giving them the proportions and strength of retaining walls. This work was done as a separate contract by the United Engineering & Contracting Co. It was begun in June, 1903, and completed in September, 1904. Half of the shaft is being used by the contractors for the Bergen Hill tunnels and half by the contractors for the river tunnels. The illustration shows the appearance of the completed shaft before the tunnel contractors erected their hoists and other plant.

Work on the Bergen Hill tunnels is being prosecuted from the Hackensack portal, the Weehawken shaft and from a shaft sunk from the top of the hill near Central avenue. The original contractor, The Shields Construction Co., went into bankruptcy about a year ago, after having got the work under way and threw up the contract. William Bradley was given the contract and his forces are at work on both sides of the hill. The two tunnels are in about 1,300 ft. from the Weehawken shaft and about the same distance from the west portal. From the shaft at Central avenue small top headings are being driven in both directions.

For three or four hundred feet in from the Weehawken shaft soft seamy rock was encountered and a tight timber lining was put in. Considerable amounts of surface water come in here, suf-



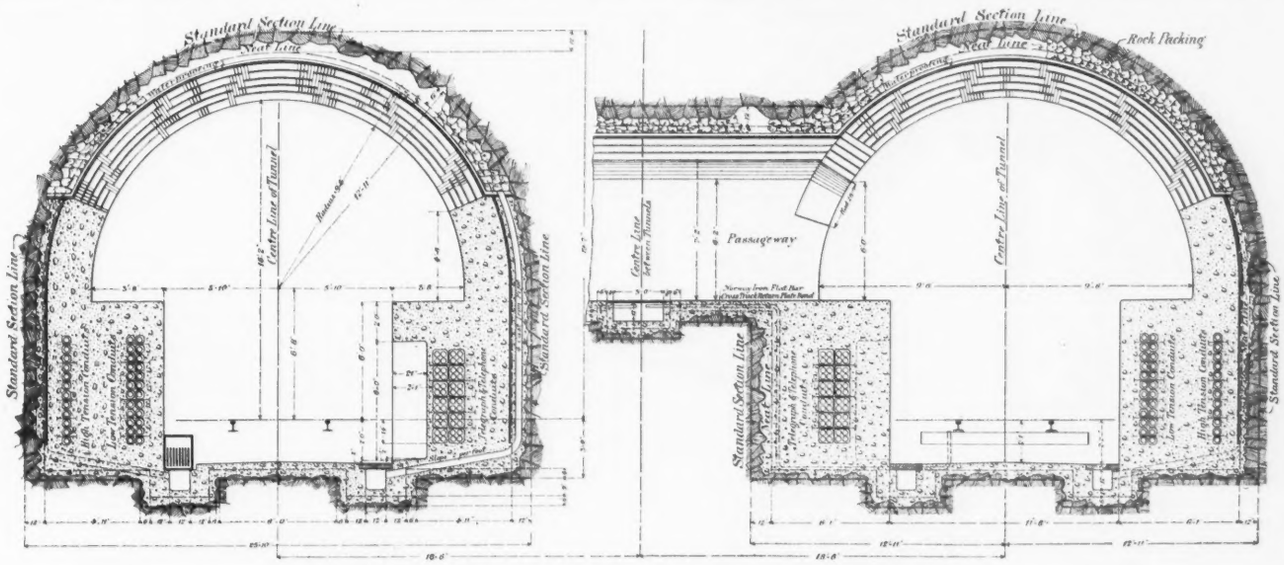
Plan and Profile of North River Tunnels; Pennsylvania, New York & Long Island.

ficient to keep the timbering thoroughly watersoaked, and it will probably be left in when the concrete lining is put in. Beyond the timbering the rock is a fairly soft sandstone which, however, is solid and safe without props. This sandstone extends in about 1,100 ft. from the shaft portal and is followed by a diagonal seam of very hard baked shale from 50 ft. to 100 ft. thick. Beyond the shale is good trap rock which extends most of the way through to the other side. The tunnels from the east end are being driven with a top heading the full width of the section and from the west end with small top headings. A Marion Model 20 shovel run with compressed air is used for mucking in the headings. The rock is loaded on skip cars and hauled to the portal and the shaft with mules. Every 300 ft. the two tunnels are connected by small cross passages in the dividing wall, and advantage is taken of this for ventilating both bores. These cross passages are boarded up except the one nearest the heading in which a portable motor-driven exhaust fan is mounted. Fresh air is drawn in through the south tunnel and sucked through the cross passage by the fan which forces it out through the north tunnel. The exhaust from the drills and the shovels also aids ventilation.

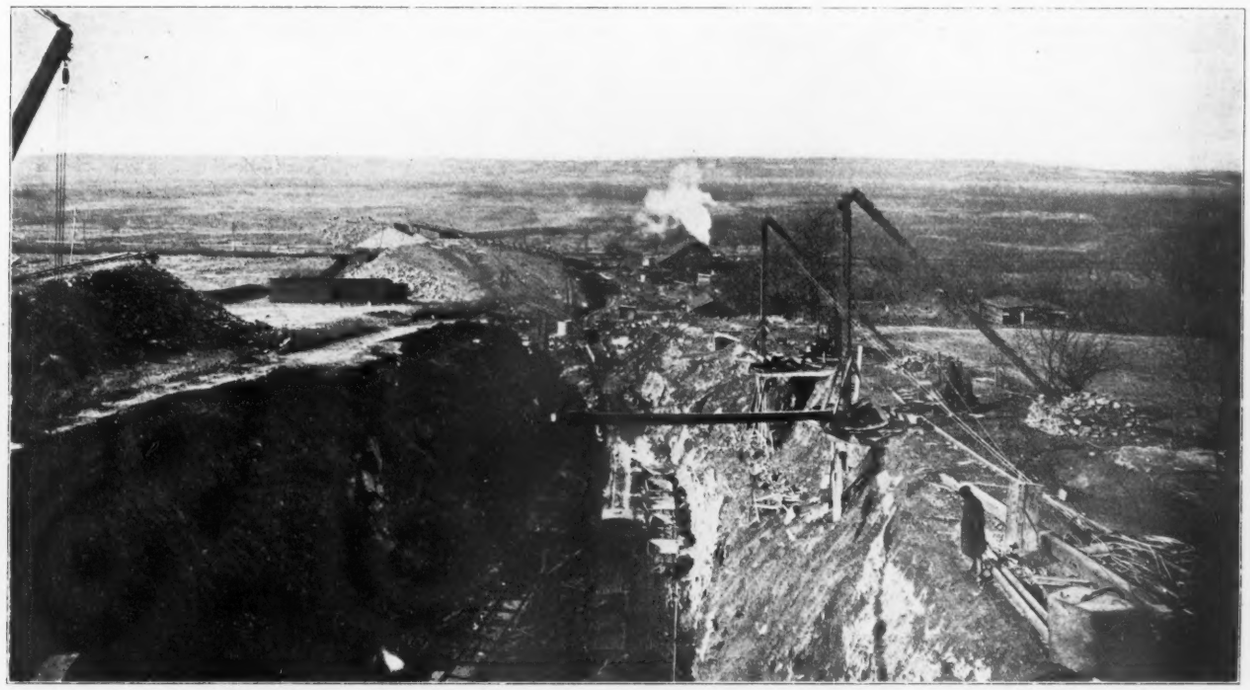
At the Weehawken shaft the skip cars are hoisted to a platform above the ground level and dumped at a tipple over cars standing on a track below. The sandstone and baked shale has been sold to the West Shore Railroad and hauled away for filling in. A crusher plant has been erected close to the shaft and as soon as trap rock is reached it will be taken to the crusher and sold for concrete. It is expected that most of the broken stone for the concrete lining of the tunnels under the hill and the river will be obtained from this source. The contractors have compressor plants at the Weehawken shaft, Central avenue shaft and Hackensack portal for furnishing air for the drills, but some additional air is supplied from the river tunnels plant at the Weehawken shaft.

The record made on the North river tunnels is remarkable for the speed with which the work progressed, the freedom from accidents of all kinds and the accuracy of the engineering surveys. Begun on the New York side early in April, 1904, and on the New Jersey side in September of the same year, communication was established between the two headings in the north tunnel on Sept. 11, 1906, and in the south tunnel on October 9. The boring under compressed air occupied about 15 months. Few lives were lost during the work and the shields in both tubes met with a variation of less than $^{1}/_{16}$ in.

The river tunnels are parallel single-track tubes 23 ft. in diameter outside, of cast-iron, lined with concrete and spaced 37 ft. apart, center to center. They are 6,118 ft. long between shield chambers and have a maximum depth at the invert below mean high water

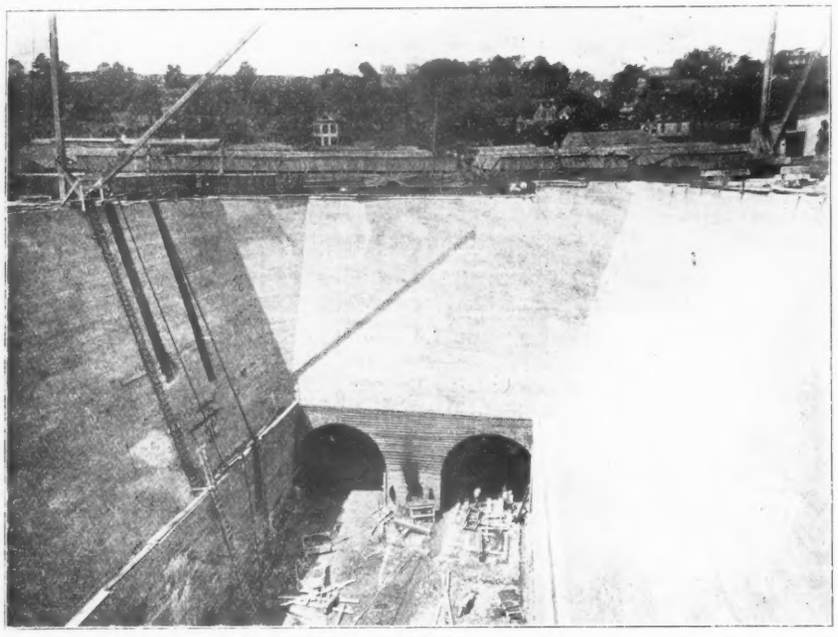


Section Through Bergen Hill Tunnels in Rock, Showing Cross Passage.



View from Hackensack Portal Showing Embankment Across the Meadows.

of 97 ft. and a minimum depth below the river bottom of 20 ft. The line is a tangent from the Weehawken shaft to a point about 200 ft. west of the Manhattan pierhead line, where a slight change



Weehawken Shaft Before Turning Over to Tunnel Contractors.

of direction, 53 min. 35 sec. to the south, is made continuing on the adjoining tangent to the terminal station east of Ninth avenue. Starting at the Weehawken shaft the grade is 1.3 per cent. descending for about 2,000 ft., then a rising grade of 0.53 per cent. for 2,000 ft. followed by a rising grade of 1.923 per cent., which continues to a point between Ninth and Tenth avenues.

The Manhattan shaft, like the Weehawken shaft, was built by the United Engineering & Contracting Co. as a separate contract. It is in solid rock below the filled ground on the surface and is not lined. The dimensions are 32 ft. by 22 ft. by 55 ft. deep. It is located on the north side of Thirty-second street, east of Eleventh avenue, and is connected at the bottom with the tunnels under Thirty-second street by a cross drift. The tunnels were driven in rock from this cross drift to the shield chambers out about 200 ft. Part of this distance is a two-track single arch tunnel running into twin parallel iron lined tunnels just in front of the shield chambers. This work was timbered while the lining was being put in.

The tunnel contractors, the O'Rourke Engineering Construction Co., secured an old foundry building adjoining the shaft to house the required above ground plant, power house, office, engineer's and workmen's quarters. A storage platform with disposal tracks for the muck carts was built over the shaft above ground, and all material, men and supplies were raised and lowered with two steam-driven Lidgerwood hoists.

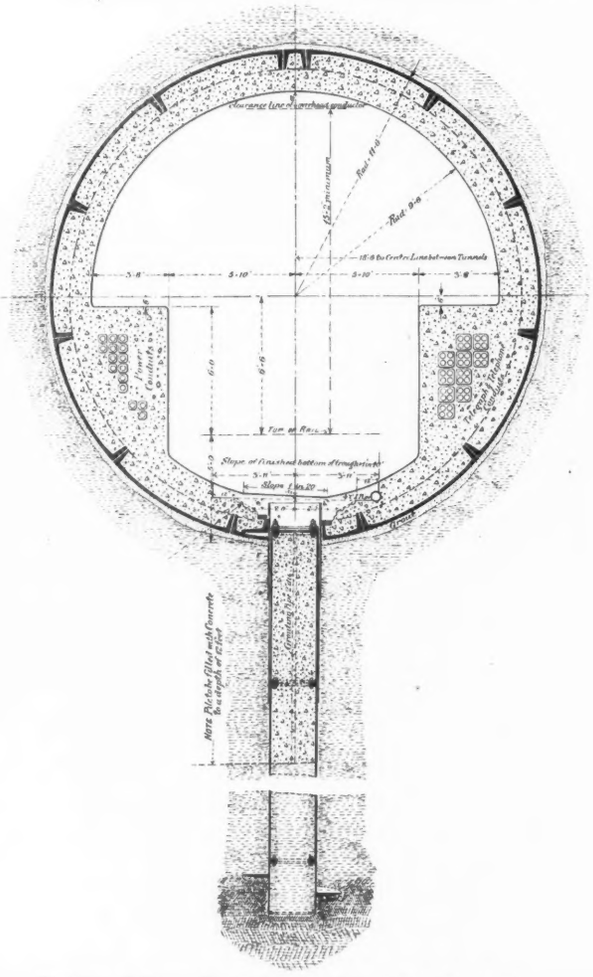
At the Weehawken shaft the contractors built a more elaborate plant, including a new power house, office building, overhead platforms, workmen's quarters and a material dock at the water's edge with a trestle leading in to the shaft. The power house is a temporary building, but the installation of the machinery was as carefully and substantially designed and carried out as for a permanent plant. All of the machinery is placed on concrete foundations and every detail of piping and auxiliary apparatus which would increase the efficiency and reliability of the plant has been provided. The general requirements were here much the same as for the East river tunnels power plant described in the *Railroad Gazette* July 27, 1906, but on a scale of about one-half the capacity since only two tubes were to be driven instead of four. High and low-pressure air, hydraulic pressure and electric current for both tubes are provided.

The low-pressure air compressors, three in number, were furnished by the Ingersoll-Rand Co. They are cross-compounded on the steam end and have duplex air cylinders, the dimensions being: Steam cylinders, 14 in. and 30 in. by 36 in. stroke; air cylinders, 22⅝ in. in diameter. At a delivery-pressure of 50 lbs. and 125 r.p.m. each of these machines has a maximum capacity of 4,000 cu. ft. of free air per minute, or a total capacity of 12,000 cu. ft. This high pressure was never called for during the tunneling operations, the maximum pressure being 30 lbs. and the average about 25 lbs. The valves on the air cylinders, both inlet and exhaust, are opened and closed by air pressure, and on the steam cylinders Corliss valve gear is used.

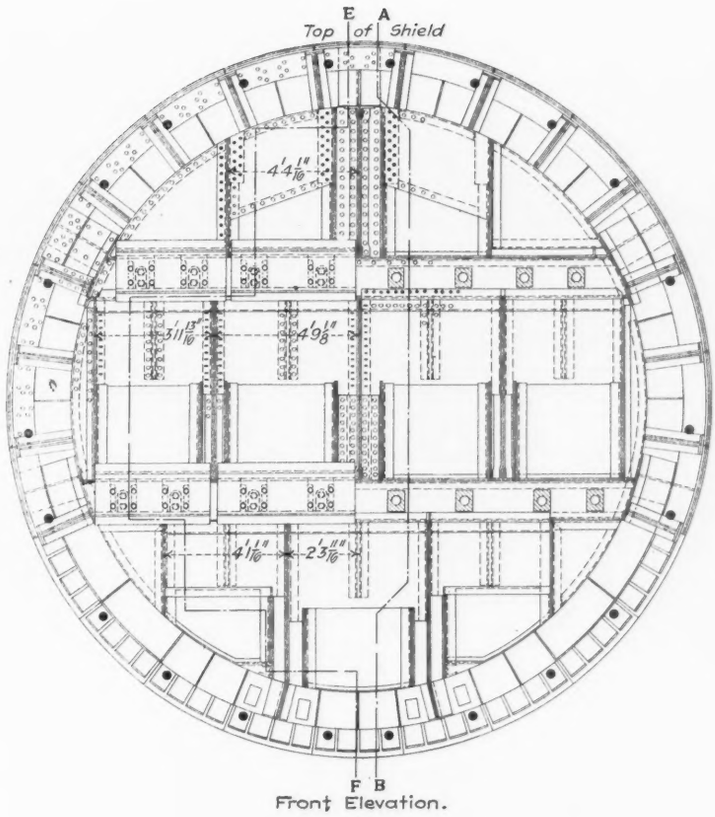
The single high-pressure compressor is a rebuilt machine having old steam cylinders with new air cylinders, and the cylinder proportions are, therefore, not theoretically correct, although the compressor has worked perfectly under trying conditions. The steam cylinders, which are 14 in. and 22 in. x 36 in. stroke, are cross-compounded and have Corliss valve gear, but the duplex air cylinders, 14¼ in. in diameter, are arranged for single stage compression. They have a normal capacity of 1,070 cu. ft. of free air per minute when taking air from the outside, but when run as second stage compressors, taking air at 30 lbs. from the low-pressure compressors, as was usually the case, the capacity was increased to about 3,000 cu. ft. of free air. This machine was designed to deliver air at a pressure of 90 lbs. above the low-pressure, or a maximum of 140 lbs. since the drills, pumps and other machinery exhausted into the low-pressure air. The piping was arranged so that in an emergency the compressor could deliver low-pressure air to supply any deficiency or so that air at high-pressure could be delivered in single stage or so that two-stage compression could be employed as explained above. In the latter case the after-coolers of the low-pressure compressors served as inter-coolers.

In addition to the air compressors the power plant also contains three Blake duplex hydraulic pumps for working the shields, supplying water at a normal pressure of 4,000 lbs. per sq. in., which could be increased to 6,000 lbs. when desired. Two direct-connected, 100-k.w., 250-volt d.c. generators supply light and power for the hoists and hauling drums in the tunnel.

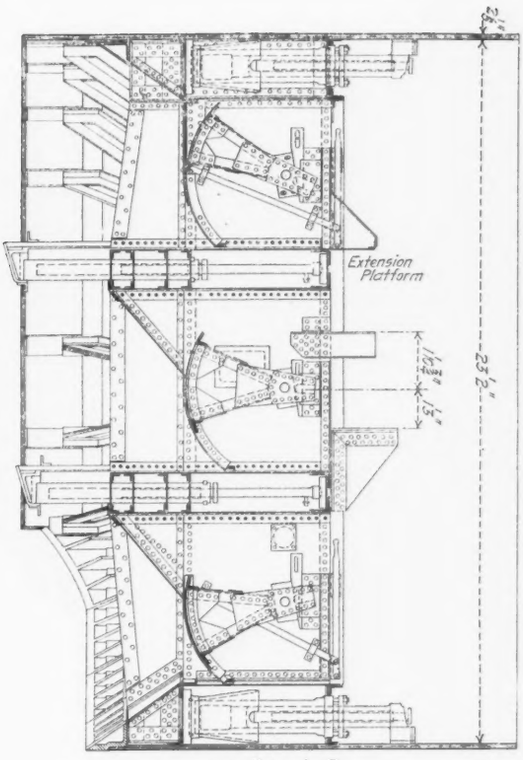
Steam at 150 lbs. pressure is supplied by three 500 h.p. Stirling water tube boilers, one serving as a reserve unit. Coal is supplied by gravity from bins filled from the trestle leading to



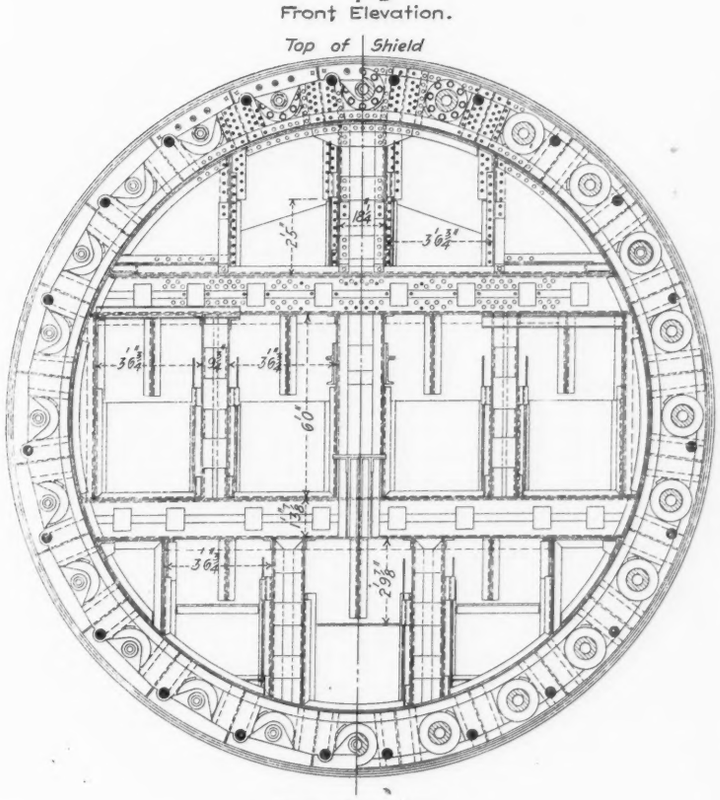
Section of River Tunnels with Screw File Support.



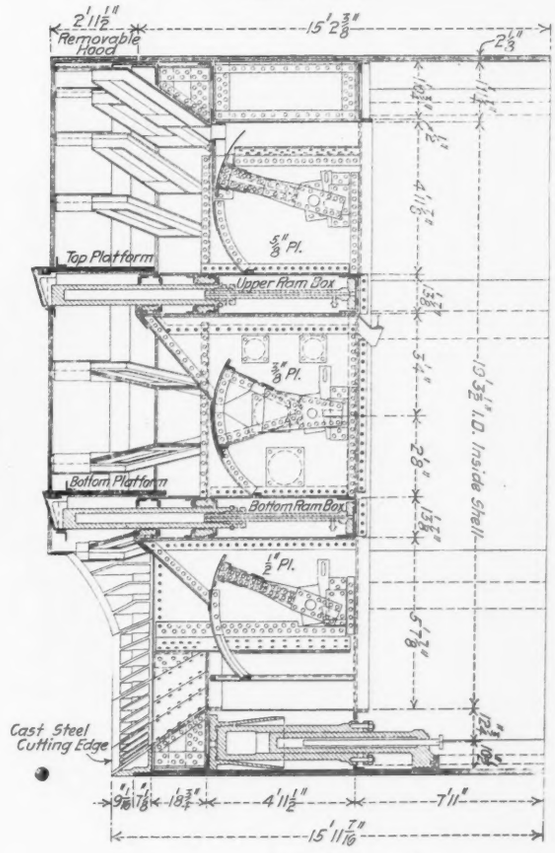
Front Elevation.



Section A-B.



Rear Elevation.



Section E-F.

Shields for North River Tunnels; Pennsylvania, New York & Long Island Railroad.

the material dock already mentioned. The compressor units all exhaust into two Worthington surface condensers which maintain a vacuum of 26 in., and the auxiliaries exhaust into a Cochrane feed water heater. The power plant on the Manhattan side is an exact duplicate of the Weehawken plant except that the building in which it is housed did not permit of so good an arrangement of the machinery. No serious accidents or breakdowns occurred at either plant during the tunneling operations.

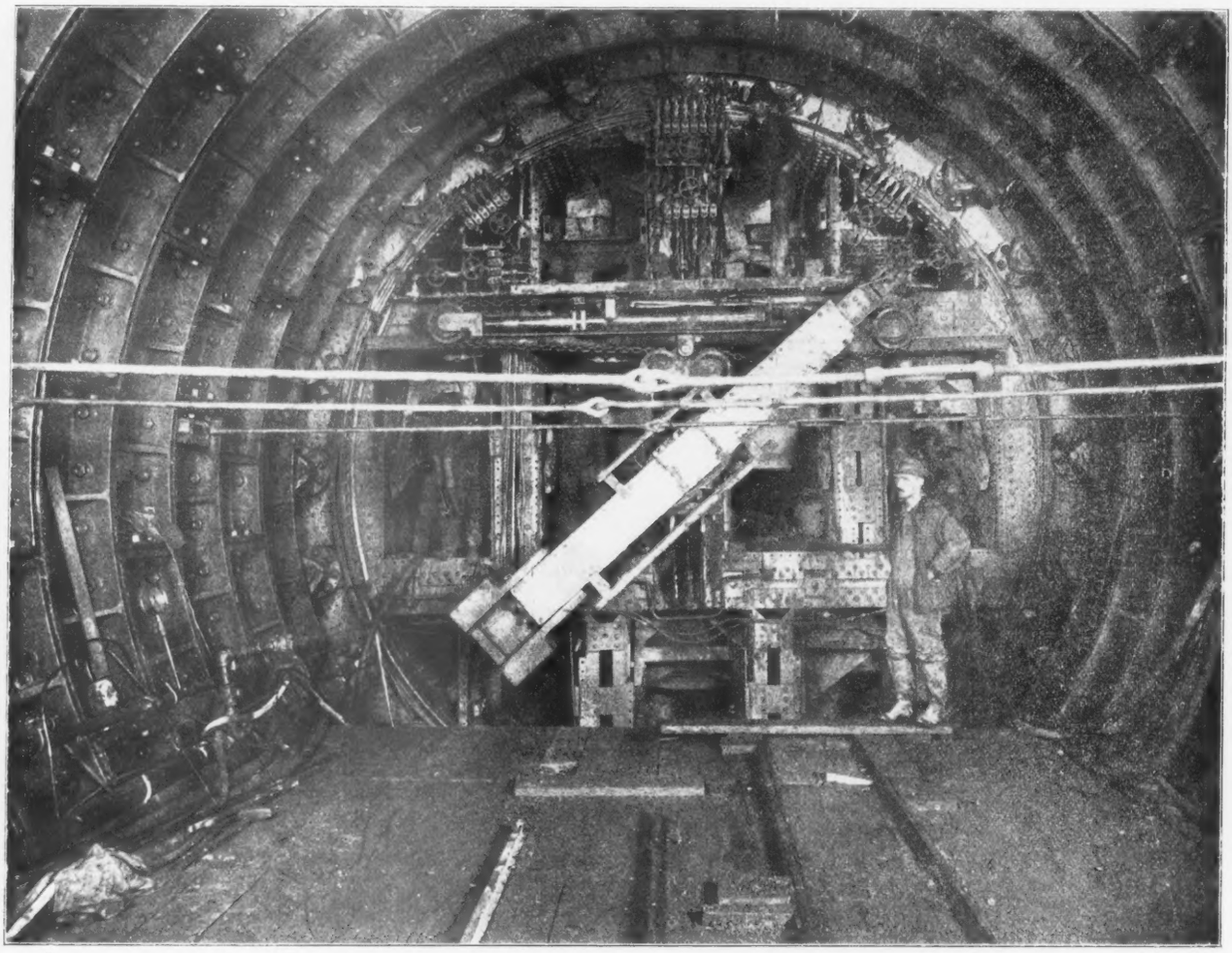
The hospital arrangements and workmen's quarters are complete and commodious. The usual double hospital locks are provided and a doctor is kept constantly on duty. The men's dressing room is large and light and kept always warm and clean. A covered passageway leads to it from the hoisting platform so that the men were not exposed on coming up. The care of the men has been in charge of Dr. W. J. Loomis, of Jersey City, and he has made a personal examination of all applicants for work. To his careful supervision has been due largely the freedom from fatal cases of caisson disease. The air in the tunnels has been kept clean and pure, averaging about 3,000 cu. ft. per man per hour.

The shields used in driving the tunnels were designed by Mr. James Forgie, Chief Assistant Engineer, under the supervision of Mr. Chas. M. Jacobs, Chief Engineer, and were built by the Riter-Conley Mfg. Co., Pittsburg, Pa. They were erected in the shield chambers cut out in the solid rock some distance out from the shafts and started out through the rock, sand and gravel until the silt or river mud was encountered. They were designed to work safely in any material and not particularly in silt, which has many peculiar characteristics with which Mr. Jacobs, Chief Engineer, was quite familiar as a result of his experience in driving the Hudson Company's tunnels under the river at Morton street. As will be seen by comparing the accompanying drawings and illustrations from photographs with the illustrations of the East river shields (*Railroad Gazette*, July 6, 1906) there are scarcely any points of similarity between the two.

The North river shields are 23 ft. 2 in. in diameter inside the tail and 15 ft. $11^{7}/_{16}$ in. long from the back end of the skin to the cast-steel cutting edge. The outer shell or skin is made up of three layers of plate ¾ in., ⅝ in. and ¾ in., having no circumferential seams. The single bulkhead has no differential air locks as in the East river shields, nor are material chutes provided. In front of the bulkhead the working face is divided into nine pockets, two on the top level, four on the middle level and three on the bottom level. Each pocket is entered through a door in the bulkhead, and they are separated from each other by vertical partitions and the horizontal platforms. To facilitate work in sand, gravel or rock the shield was provided with a removable hood projecting 2 ft. 1 in. beyond the cast-steel cutting edge at the bottom. This hood was designed to extend down to the level of the bottom platform, as shown on the drawing, but it was built to extend only to the level of the top platform, the cast-steel cutting edge being carried up to that level. The hood was built in segments and bolted to the skin plates, being stiffened by brackets attached to the ring in front of the rams. The working platforms, eight in number are carried on rams and could be forced out about 8 in. in front of the hood. Each platform is supported by two rectangular ram chambers working through brackets attached to the front of the bulkhead. The outer ends of the ram plungers are attached to the cross girders in the rear of the bulkhead under the rear platforms. When working in rock, drilling could thus be carried on on three levels, and in sand or wet ground the platforms were strong enough to support the breast boards in the face.

The doors in the bulkhead are a new departure in shield design. They are pivoted segments mounted on the stanchions in the rear of the bulkhead and rising in a vertical arc to open. The weight of the door assists in closing and no displacement of incoming muck is made when the opening is closed. A simple catch holds the door in any desired position. When working with the hood and mucking back from the forward platforms the doors were normally open, but after getting into the silt the upper doors were kept closed and the muck forced in through the lower doors. With the muck coming in it was necessary to employ jacks to force down the doors after a shove. Another expedient was to bolt 6-in. x 6-in. angles on each side of the door opening and block up the opening with 6-in. x 6-in. timbers. These timbers could be chopped away to let in the muck.

The pushing jacks, 24 in number, are spaced equidistant around the shell in pockets formed by radial diaphragms connecting the inner and outer skin. Each jack rests in a cast-steel socket bearing



Rear View of Shield, Showing Erector and Flooring in the Tunnel.

against the heavy ring which backs up the cutting edge. The jacks are single acting, with a separate internal pull back ram bearing against the lining ring. They were built by the Watson-Stillman Co. The main ram is 8½ in. in diameter, with a stroke of 3 ft. 2 in., while the pull back plunger is 3 in. in diameter. With a maximum hydraulic pressure of 5,000 lbs. per sq. in. each jack can exert a forward pressure of 142 tons, or a total of 3,400 tons for the entire shield. The shoving jacks, platform rams and erector are all controlled from a platform on the rear of the shield above the erector. The valves, piping, etc., are shown in the photograph.

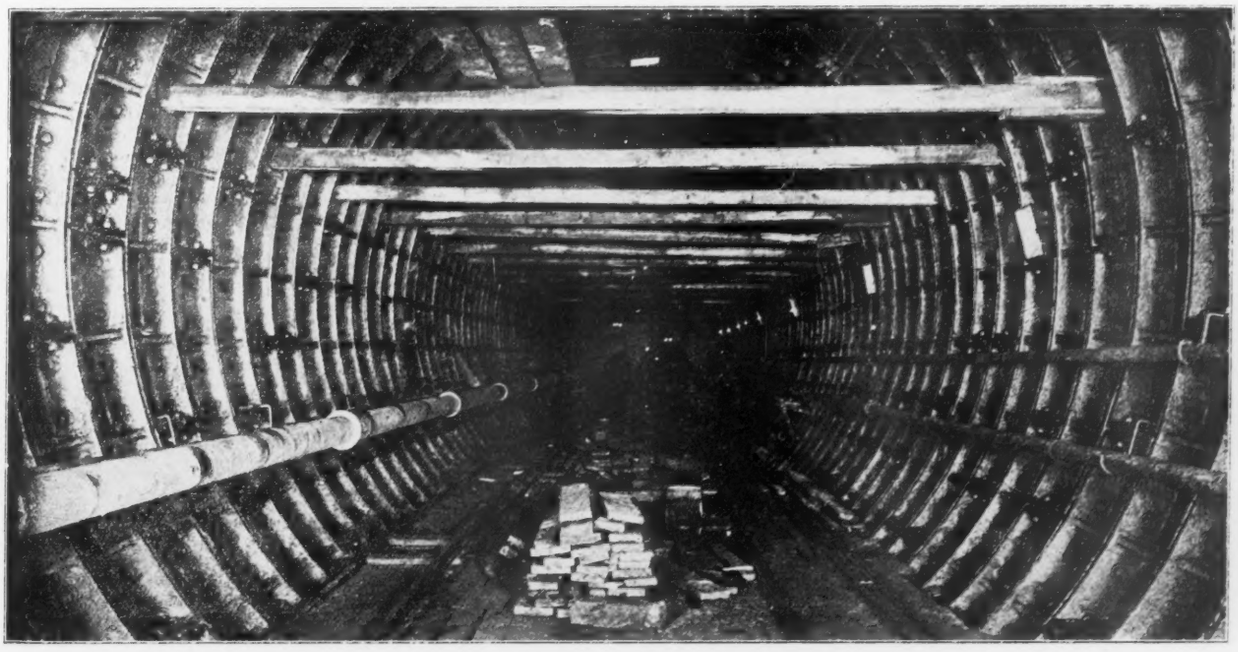
The erector, which is shown in the photograph but not on the drawings, consists of a pivoted hydraulic cylinder which is rotated by chains attached to two fixed horizontal cylinders. The rotating cylinder and piston which carries the erecting head or grip for picking up the lining segments at one end and a counterweight at the other is pivoted on a heavy bracket attached to the lower platform at the exact center of the shield, so that it has a radial thrust in all directions. On the back side of this cylinder and keyed to the pivot is a chain sheave around which the rotating chain passes. Two smaller horizontal cylinders with pistons working in opposite directions are mounted on the upper horizontal diaphragm, these pistons having chain sheaves at their outer ends around which the rotating chain passes. Two small idler sheaves are mounted below these cylinders. By forcing out one piston the rotating arm is revolved in one direction and the other piston is forced in. Motion in the opposite direction is obtained by reversing the movement of the horizontal pistons. The arrangement is simple, powerful and easily controlled and has the advantage of giving a direct radial thrust for placing the key segment in the crown.

From the Weehawken shield chambers out, the rock was cleared, in about 150 ft., after which 300 ft. of sand and gravel was passed through before reaching the silt. A bad slip occurred over the workings soon after leaving the shield chamber on the north tube and the ground under the railroad yards above subsided several feet. This caused only a short delay, however, and did no serious damage to the tunnels. The first air lock and bulkhead was put in just in front of the shield chamber and the second lock about 1,200 ft. farther out. The bulkhead is of concrete 10 ft. thick and contains three locks, man, material and emergency, in addition to carrying through the various pipes leading to the heading. The man and material locks are on a level with the temporary floor in the tunnel and the emergency lock is above and to one side.

The view of the completed tunnel looking toward the advance bulkhead shows the working floor, tracks, pipes, etc., which were carried up close to the heading as the shield was pushed out. The working floor is built in sections and is about 4 ft. above the invert and is 15 ft. wide. It carries two narrow-gage tracks, over which the muck cars run. An electric haulage system was installed between the first and second bulkheads for bringing out the loaded muck cars and empty material cars. The grade between the bulkheads, a distance of a little over 1,000 ft., is 1.3 per cent. Beyond the first bulkhead the cars were hauled to the shaft hoists by a steam winding engine and cable. The runway in the crown of the tunnel, supported by 6-in. x 6-in. timbers, was primarily built for the use of engineers in charge of alinement whose bench marks and verniers were built in concrete blocks set in the lining at one side near the crown. It also served as a runway to the emergency lock in the bulkhead, to be used in case of flooding. The lighting in the tunnel was provided for by incandescent lights on the sides every 25 ft. and lights under the crown. The 10-in. low-pressure air main shown to the left is a spiral riveted steel pipe with flange joints. The outlet, which was always kept close behind the shield, was provided with a flap valve to prevent air from blowing back in case of a break above ground. The 5-in. blow-out pipe was kept open constantly, and as comparatively little water came in at the heading good ventilation was always secured at the shield.

After the shields got into the silt the progress made was rapid. The best single record was eight complete rings, or 20 ft. erected in an eight-hour shift made in the south tube from the Weehawken end, but six rings was a common performance. With one ring erected and temporarily bolted up the bottom middle door was opened and pressure turned on the shoving jacks. Usually only eight jacks were used, two on each side, one at the top and three at the bottom. The silt with a consistency of thick plastic mud came in through the door in a square stream, preserving its shape like paint squeezed from a tube. This was shoveled into waiting muck cars as quickly as possible and the invert cleared for the bottom segment. Between 20 and 30 per cent. only of the total volume displaced by the advance was taken in through the shield. An advance of 2½ ft., the width of one ring, was roughly equivalent to the displacement of 30 cars of muck, each car holding 1.5 cu. yds. From six to ten cars were taken in during a shove, depending on the movement desired by the shield and the lateral displacement observed in the parallel tube. When the shove was completed and the rams drawn back the erection of the next ring was begun at the bottom. Permanent bolting followed the advance of the shield very closely, this work being done from a movable gantry platform supported on rollers bolted to the lining above the working floor. This platform enabled the men to reach the top segments of a number of rings behind the shield and finish the bolting without interfering with the operations at the shield. From 30 to 40 men constituted a shift in each heading.

The relative positions of the four headings varied from time to time during the work owing to slight delays in one tube or the other and to the desire of the engineers to prevent too great a disturbance in the river mud. The Manhattan shields had a start of nearly three months over the Weehawken workings, and as no delays or accidents of consequence occurred in the north tube it was pushed forward and met the north Weehawken shield 168 ft. west of the state line, which is approximately half way across, on Sept. 11, 1906. The Weehawken south shield was at that time in advance of the north shield. A blowout under the river bulkhead wall which flooded the workings delayed the Manhattan south shield, and as exceptionally rapid progress had been made by the shield working east the two south headings met October 9, 370 ft.



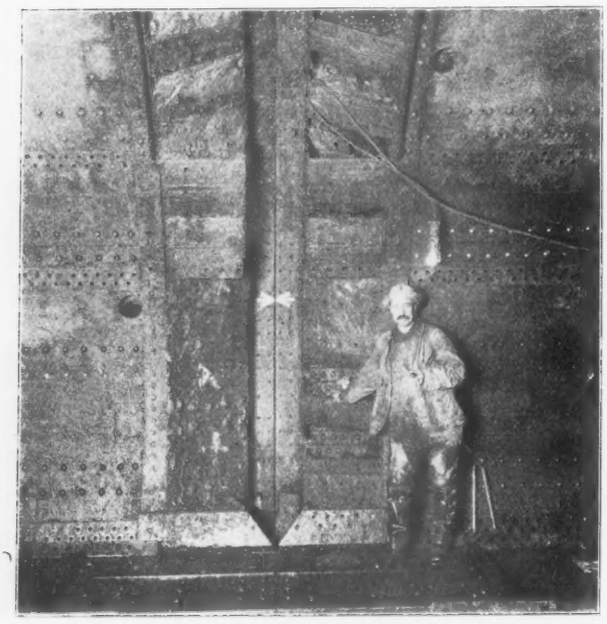
Interior of South Tunnel, Looking Towards Outer Bulkhead.

east of the state line. The perfect accuracy of the surveys and operation of the shields is well shown in the photograph of the cutting edges in contact after dismantling had begun. The alinement, elevation and rotation of the shields about the central axis coincided exactly.

When communication was established through it was found that the Weehawken south shield in passing under the docks on the river bank had encountered a number of old piles sunk deep in the mud, and these had been pushed across the river ahead of the shield, but without damage to it. In fact, none of the shields were distorted or damaged in any way except some slight dents in front of the bulkhead due to blasting in rock. They were taken down in the tunnels and all the parts brought to the surface in good condition; if necessary they could be reassembled and used over again.

The unstable nature of the silt through which the tunnels pass caused the chief engineer to make provision for supporting the tubes on screw piles every 15 ft. None of these piles have as yet been driven, but bore segments through which the piles can be sunk were built in the invert every 15 ft., each segment being the width of two rings. These segments will permit a pile 2 ft. 8 in. in diameter with a screw blade 4 ft. 8 in. in diameter to be passed through the lining. Experiments are now being made above ground with electric driving machinery to put down these piles.

The next step in the work will be the putting in of the concrete lining 2 ft. thick. This will not present any special difficulties.



Junction of Shields in North Tunnel, Showing Perfect Contact of Cutting Edges.

Both tunnels will probably be entirely completed long before the contract time and before the adjoining land tunnels or terminal station are ready.

The organization and co-operation of forces has had much to do with the successful and rapid completion of the work. The line from Harrison to the state line under the river is being built under the name of the Pennsylvania, New Jersey & New York, and from the state line east to Long Island under the name of the Pennsylvania, New York & Long Island. The work west of the terminal station beginning at Ninth avenue is known as the North River division, with Mr. Charles M. Jacobs as Chief Engineer in charge. Mr. James Forgie is Chief Assistant Engineer, Messrs. B. H. M. Hewett, Wm. Lowe Brown and H. F. D. Burke are Resident Engineers on the subaqueous work under the North river. Mr. F. Lavis is Resident Engineer of the Bergen Hill tunnels, and Mr. B. F. Cresson, Jr., is Resident Engineer on the portion of the terminal station west of Ninth avenue. An advisory board of engineers is appointed by the two companies, consisting of General Charles W. Raymond, U. S. A., Chairman; Messrs. Charles M. Jacobs, Alfred Noble and George Gibbs. The work is divided into five sections, each in charge of a resident engineer. All of the engineering details were worked out by the railroad company's forces, and every push of the shields was directed by the resident engineer. A large force of inspectors and surveyors was employed constantly in checking elevations and alinement, distortion of the lining, etc., this work being done on a regular daily schedule. The contractors, the O'Rourke Engineering Construction Co., supplied the plant and labor under the direction of the railroad engineers, and worked with them in perfect co-operation. We are indebted to Mr. Jacobs for the information and illustrations from which this article was prepared.

The Grand Trunk's New Freight Terminal at Toronto.

The new freight terminal which the Grand Trunk has lately finished at Toronto gives facilities for handling business at that important traffic point that are not only ample for present requirements, but will also be enough for considerable future growth. It occupies a new site, near the old terminal, but more accessible. The location is convenient to the important wholesale and manufacturing districts of the city.

The buildings are substantial and handsome. They include an office building fronting on Simcoe street, 44 ft. wide, 180 ft. long and two stories high, an inbound freight house, 50 ft. wide and 955 ft. long, an outbound house, 40 ft. x 910 ft., and a covered transfer platform between, 16 ft. x 910 ft. The office building is a solid brick structure on concrete foundations, with stone trimmings and interior finish of Southern pine. It is steam heated, has its own electric lighting plant, and is fully equipped with vaults and all other necessary facilities.

The two freight houses are of similar construction. The concrete piers, resting on concrete foundations, are spaced 15 ft. on centers and carry Phoenix columns with bottom and top castings which support steel latticed roof trusses. The roof is formed of 2-in. x 8-in. rafters, 2-ft. centers, overlaid with 1-in. hemlock boards covered with four-ply felt and gravel roofing. Nine feet above the floor, between columns, is a 6-in. x 8-in. girder supported at the ends by brackets riveted to the columns, and at the middle by a ¾-in. bolt running up through the beams. This girder supports the door track. Above each door, on both sides of the building, are two sashes, 6 ft. long x 4 ft. high. Above these windows are riveted beams carrying 5 ft. of brick work with a stone coping. The doors are continuous, hung alternately outside and inside, enabling cars and wagons to be unloaded at any point. The floor consists of ⅞-in. maple laid diagonally over 1-in. hemlock resting on 2-in. x 12-in. joists, 2 ft. on centers.

The transfer platform has a row of concrete piers on 15-ft. centers supporting an umbrella roof. The posts are Phoenix columns, and angle bar braces carry the roof, formed of 15-ft. purlins covered with corrugated iron. The platform floor is 2-in. plank nailed to 2-in. x 12-in. joists. There are three tracks in the space for inbound cars and five tracks for outbound cars. The terminal occupies an entire block of 425 ft. in width. The freight houses fill 200 ft. of this, and the remainder is used for team tracks, of which there are five pairs, with the necessary roadways between. The entrance to the terminal is over a single track which crosses Front street diagonally and then joins the converging sidings which run across John street into the terminal.

All tracks are numbered, the house tracks running from 1 to 8, and the team tracks continuing up to 18. The latter are accessible to teams directly from the street. For the guidance of teamsters, the team side of the outbound house has the different doors marked with lettered boards to indicate where goods are received for various "runs," and such goods are accepted only at the proper doors. On the inside of the doors on the track side of the house there are boards to indicate the "runs" and tracks. All doors are numbered. The cars on the house tracks are "spotted" in placing, to give free access to each car and to the transfer platform. The five outbound tracks are divided into sections or train loads to obviate unnecessary switching. The trains to be despatched first are placed at the outer ends of the tracks to facilitate movement and avoid disturbance to the work of loading.

Gang checkers direct the movements of the men. A list is made out each morning showing cars and location, and copies furnished to the checkers. Truckers are given numbers and are directed by a checker, who chalks packages to show what trucker handles them and in which car they are to be put, as well as the number of the track on which the car stands. For example, a package for trucker No. 81, car No. 14, on track No. 3, is chalked "81-14-3." This enables the stower to locate errors in placing. Each stower has two tiers of cars—ten in number—on the outbound tracks and attends to the loading of these cars by the truckers. Carloads of cartage freight are delivered on the team tracks, Nos. 11 to 18, checkers in charge handling the goods direct to teams. Tracks Nos. 9 and 10 are used for outbound carload traffic, which is loaded direct from the teams, the freight being weighed on team track scales. Spare cars for emergencies are worked at present on the head end of tracks 6, 7 and 8, where they can be most easily switched, after loading, to the trains required. The cars on all these "runs" are placed in station order for way freights, so that trains are complete when the cabooses are attached.

Team tracks 17 and 18 are spanned by a 20-ton electric crane, which also serves the adjacent team roadway. It has a steel superstructure resting on concrete piers.

We are indebted to F. H. McGuigan, Fourth Vice-President, for this information.

GENERAL NEWS SECTION

NOTES.

The New York, Philadelphia & Norfolk Railroad will reduce local passenger fares January 1.

The Southern Pacific has bought a large tract of land in San Francisco, south of its ferry terminal, which is to be converted into docks for ocean steamers.

The Southern Car Service Association has been organized at New Orleans to take the place of the Louisiana Car Service Association; the manager is Seely Dunn.

Chicago newspapers say that the Central Freight Association has asked the Eastern lines once more to join it in an effort to agree on a uniform freight classification.

The State Railroad Commission of Indiana has ordered a general reduction in freight rates on all classes on the Vandalia Railroad between Indianapolis and Terre Haute.

An advance of two cents an hour in the pay of all machinists, with a maximum of 37 cents and a minimum of 35 cents, has been announced by the Chicago & Eastern Illinois.

The clerks of the Sixtieth street, New York, freight station of the New York Central & Hudson River are going to hold a ball under the name "New York Central Lions" at the Murray Hill Lyceum on January 8.

The Erie Railroad now has one ferryboat running between New York and Jersey City on which no teams are carried, the whole of the space on the main deck being given up to passenger rooms. The seating capacity has been increased from 226 to 505.

A Pittsburg dispatch says that 12 barges now being loaded with coal at that city are to be floated down the Ohio and Mississippi rivers to New Orleans, and thence towed direct to Havana. The barges are of steel and carry each about 12,000 bushels of coal.

An officer of the Burlington at Chicago is quoted as saying that the company cannot afford to continue running a fast mail train between Chicago and Omaha if the government carries out its rumored intention of giving a part of the through mail to a competing railroad.

William A. Lindsay, engineman in charge of a locomotive at the Grand Central Station, New York City, which recently ran over a man, was required by the coroner to give $10,000 bail. The coroner holds that the imposition of heavy bonds will be a good way to reduce the number of fatal accidents.

The Chicago, Burlington & Quincy is to put on an additional train between Minneapolis and LaCrosse for the purpose of relieving the Chicago day express, so that the fast time of this schedule through to Chicago can be made without the excessive speed which would be made necessary by the long stops at stations.

It appears that some of the recent delay in shipping coal to the suffering cities of the northwest was due to a reduction of 20 per cent. in rates, which shippers heard of 30 days before it went into effect. Knowing that the cost of transportation could be reduced by waiting a month, shippers took the risk of postponing their orders.

It is reported in Chicago that the Chicago, Milwaukee & St. Paul is to reduce by 10 per cent. the freight rates, on all classes of goods, from Chicago to all points in the Northwest, to meet recent reductions made by the Great Northern and the Northern Pacific which have given St. Paul, Minneapolis and Duluth advantage over Chicago.

Pennsylvania newspapers say that after this month employees of the Pennsylvania Railroad will have to buy their coal of regular retail dealers, the privilege of buying it at the railroad companies' mines being cut off. It is estimated that the employees have saved annually hundreds of thousands of dollars by reason of this favor from the company.

According to the Salt Lake *Tribune*, a plan, which has been agitated considerably, to establish a state railroad commission in Utah, has been put to a sudden death by an order from President Joseph Smith, who is a director of the Union Pacific Railroad, and at the same time a political boss. He does not want any railroad commission established.

The Louisville & Nashville and the Louisville & Eastern have paid $1,400 each to the state of Kentucky in consideration of the withdrawal of indictments for requiring employees to work on the Sabbath, which is unlawful. The indictments were returned by the grand jury on account of work done on Sunday when each of these roads was trying to prevent the other from laying track on disputed ground.

A St. Paul paper prints a story to the effect that the railroads have this year delayed making rates to move grain from Minnesota and North Dakota to Lake Superior until the close of navigation, so that a longer rail haul could be secured; that this prevented the movement of cars, westbound as well as eastbound, and therefore was the cause of the recent scarcity of coal in North Dakota. No specific statements of facts are given to substantiate this story.

Lucius Tuttle, arbitrator in the long-pending dispute concerning passenger fares from Chicago eastward, has decided that the Michigan Central ought to charge a rate about midway between that of the standard lines and that of the so-called differential lines. For example, first class, Chicago to New York, standard, $20; differential lines, $18; Michigan Central, $19. On business going to Boston, Mr. Tuttle classes the Michigan Central as a standard line, so far as first-class passengers are concerned, but the second-class rate he makes $18, or $1 less than the standard rate.

The Metropolitan Street Railway, New York City, will no longer have men stationed at intersections of lines to give free transfers to passengers, but will require passengers in every case to secure the transfer from the conductor when paying fare. An officer of the road says that the cheating due to the giving of transfers, in crowds, to people who have not paid fare has amounted to a loss of $100,000 a year. Many persons have secured two transfers, one from the conductor and another at the junction. In such cases one of the transfers is frequently traded for a newspaper.

The Interstate Commerce Commission, amending its circular of October 12, No. 5A, holds that it will be proper for railroads to accept a guarantee of an association so that return tickets, at reduced rates, on the certificate plan, may be issued on the first day of a convention or meeting, without waiting to see whether there will be enough passengers to justify the reduction; it being understood that the railroad will in good faith require the society to pay the difference agreed upon. Concerning the permission given in circular No. 5A to reduce through rates to the sum of locals on only one day's notice, the Commission extends the time indefinitely; that is to say, such changes may be made without limit, until further notice from the Commission.

A large percentage of the brotherhood firemen on the Southern Pacific lines in Texas and Louisiana struck and left their engines on Sunday last, and their leaders threatened to tie up the road, if necessary to gain their ends; but, according to press despatches of Tuesday, the passenger trains were kept running, with no great delays, and, according to an officer of the road, a large percentage of the freight was moved. Many of the engines on these lines burn oil, and, according to the statement of one officer of the road, "a new fireman becomes proficient in a single trip." The grievance on which the strike is based is that enginemen who belong to the brotherhood of firemen, but who do not belong to the brotherhood of engineers, are obliged to have their complaints settled through a committee of the engineers' brotherhood—a truly desperate situation!

The Southern Railway and the brotherhood representing the machinists in its shops who struck a few months ago have reached an agreement on wages, which is to be in effect from September 1, 1906, to November 5, 1907. At most of the shops the rate is increased 2 cents an hour over the former rate. At Birmingham and Sheffield the increase is 1½ cents. The trainmen, enginemen and yardmen of the Western Maryland have received an advance in pay, said to be about 10 per cent. The firemen of the Long Island road have had their pay increased 12 per cent. The enginemen of the same road are said to have had an increase, but the rate is not given.

The Brotherhood of Railway Trainmen, after protracted conferences, announces that the railroads terminating at New York harbor have agreed to pay their conductors and brakemen in yard service in New York City territory 4 cents an hour more than heretofore, and have agreed to the arbitration of the demand of the Brotherhood for 1 cent an hour additional. The New York Central and the New York, New Haven & Hartford some weeks since granted the demand of these men for an increase of 5 cents an hour, and the officers of the brotherhood announced last week that on all of the other roads they were going to strike, because those roads refuse to grant the 5-cent increase. They even sent an ultimatum on Thursday threatening to stop work on Saturday, December 22, but from this position they appear to have backed down. The officers of the railroads say that already in the last three years these classes of employees had received increases of 33 to 50

per cent. The number of yard men affected by the present increase is variously stated at from 1,700 to 3,500.

Sixty-five Mile Interurban Line in Texas.

Contracts have been let by the Texas Traction Company for the equipment of a 65-mile electric road between Dallas and Sherman, Texas. The new line will parallel the existing steam road between the two cities and will be one of the longest electric roads in the state. While the apparatus is standard direct-current throughout, the equipment, in some respects, presents several features of interest.

The country through which the new line is laid out is flat and rolling, there being no grades exceeding 1 per cent., and a maximum curvature of but 3 deg. In order to have a clear headway for operating cars, a private right-of-way has been established by the company, so that the run between Dallas and Sherman will be made in 2 hours and 30 minutes. This schedule includes a 15-minute run within the city limits of Dallas, where the cars must necessarily be operated at lower speeds. While the main traffic will be of an express nature, stops have been provided about every two miles to take care of the local travel.

Fifteen car equipments will be provided to maintain the initial schedule. These will be of the standard interurban type, each 50 ft. long, and equipped with four GE-73 (75 h.p.) standard direct-current motors equipped with the Sprague-General Electric Type M system of multiple unit control. Each car will be further provided with General Electric air-brakes and compressors.

Power for the new road will be generated by steam at McKinney, a town located about midway between Dallas and Sherman. The main power station equipment will include two 1,000-k.w. Curtis steam turbo-generators working under a steam pressure of 150 lbs. at the throttle with 125 deg. superheat. The turbines will operate condensing current, will be generated at 2,200 volts and 25 cycles, and stepped up for transmission to 19,100 volts. For exciting the fields, two 35-k.w. generator sets will be provided. The compactness and low maintenance charges of these machines adapt them particularly for exciting units.

The three-phase current from each of the turbo-generators will be transformed in a set of three 330-k.w., air blast transformers. One transformer of the same capacity will be installed as a reserve. To supply air for cooling, duplicate blower sets will be furnished, one set being driven by an induction motor, the other by a direct-current motor. Each blower will have a capacity of 10,000 cu. ft.

One of the special features of interest in the new road lies in the rotary converter equipment. Six substations will be provided, including one at the main station, and a portable equipment consisting of a special car containing a 300-k.w. rotary converter, air blast transformers and suitable switching apparatus for cutting into the transmission system wherever necessary. The portable substation renders unnecessary the duplication of rotary converters at the fixed substations for the portable equipment can be shifted to various parts of the line and used as an emergency station or auxiliary in case of need.

Regular substation equipments are to be provided at the main station and at four points distributed along the railroad. Each of these substations will be equipped with a 300-k.w., 600-volt rotary converter with the necessary switchboards, oil-cooled transformers and lightning arresters.

The substations will be interconnected by high tension transmission lines, operated initially at 19,100 volts. Eventually, however, a transmission potential of 33,000 volts will probably be used, and for this purpose taps will be provided for Y connection of the transformers. With the few exceptions noted the new line follows, in general, the standard direct-current practice of the General Electric Company.

The Russian-Asiatic Railroad.

Col. Beresford, formerly English military attaché at St. Petersburg, recently delivered an address in London on the lines of railroad that are projected by Russia towards British India. Of the lines completed, the one from Orenburg to Tashkend is of the greatest present importance, as it puts Russia in direct communication from St. Petersburg to Kush-Port, on the Afghanistan frontier. It is 1,230 miles from St. Petersburg to Orenburg; 1,500 miles from Orenburg to Tashkend, and 450 miles from Tashkend to Kush-Port, or 3,180 miles in all. The projects include an extension of the Central Asiatic Railway and the construction of a line across Persia toward India. The first will have its terminus at Kerki, a point located a few miles north of the Afghan frontier; while the second, passing beyond the point where English and Russian lines are forbidden by treaty in the dominion of the Shah, follows the old caravan route to Mescheh and Kush-Port, thence reaching Hêrat and Farah it bifurcates towards Seistan and Kandahar, the strategic importance of which was emphasized.—*Le Journal des Transports.*

Report on Canadian Transcontinental Railway.

The report of the Transcontinental Railway Commission for the year ended June 30, 1906, recently issued, states that the Grand Trunk Pacific is the first railroad in Canada over 300 miles long that has laid out its line for construction with grades not exceeding 0.4 of 1 per cent. adverse to eastbound, and 0.6 of 1 per cent. adverse to westbound traffic, with curves of a minimum radius of 1,433 ft., except in a few instances where curves of 955 ft. radius have been obtained. These easy grades necessitated a large amount of extra work, and the cost of construction will be considerably greater than had 1 per cent. grades been used, but the immense advantage in operation is regarded as sufficient to warrant the additional outlay. Chief Engineer Lumsden has reported to the Commission as to the character of the country through which the line will pass. From Weymoutachene on the St. Maurice river, Que., for the first 100 miles westward it is rough and broken, and moderately so for 50 miles more. After crossing the head waters of Obaska lake, the land is much flatter, and construction work from that point to the boundary between Quebec and Ontario for about 120 miles will be comparatively easy. West of the boundary for 402 miles to a point near Kashkagama river the work will be lighter, with the exception of approaches to river crossings. Very little rock occurs in this section, but owing to the number of streams a considerable amount of bridging will have to be done. This area contains plenty of good land suitable for settlement. A tract of rough and broken land follows, extending from the Kashkagama river westerly to the junction with the Grand Trunk Thunder Bay branch, including numerous lakes and rocky ridges, and from the junction west for 185 miles the work will be very heavy, consisting largely of timber trestle work. The country for some 65 miles east of Winnipeg is prairie, and the work will be light.

At Prince Rupert, the Pacific coast terminus of the Grand Trunk Pacific (National Transcontinental) line, work is well under way. A number of buildings are going up and a force of 200 men are engaged in survey and hydrographic work. The population is about 400, nearly all of whom are in the employ of the company.

Decrease in Exports of Canned Meats.

A recent Consular and Trade Report reviews the exports of meat products for the first nine months of the current year. All classes except canned meats during this period made large gains over previous years. The foreign sales of canned meats were as follows:

	First nine months,		
	1906.	1905.	1904.
Canned beef	$3,060,983	$5,178,627	$3,325,208
Canned pork	498,955	685,770	651,428
Other canned meats..	972,811	1,424,886	1,420,501
Total	$4,532,749	$7,289,283	$5,397,137

The real loss in the American canned meat trade abroad has not been so heavy as would appear from these figures. The purchases of Japan from the United States for the first nine months of 1905 in canned beef alone amounted to $1,307,415. These were evidently almost entirely for armies in the field, since the Japanese purchases of these goods for the same period of this year were only $9,820. Thus with the deduction of the Japanese item, the net loss of the American canned meat trade for 1906 up to September 30, amounts to $1,458,939. The sales of American canned beef increased greatly in Germany, Central America and South Africa during this period.

The United States Consul at Cardiff, Wales, writes as follows in regard to the effect of the packing-house scandals on the market for United States meats in the United Kingdom:

> When the meat scandals were made public last summer, many British papers exploited them and very exaggerated statements were published broadcast. This was due to national rivalry, a natural prejudice which springs up between competitors, and, above all, to commercialism of the penny press. But when, a few weeks later, the more reliable journals began to expose the meat scandals of the home market, a reaction set in, and the cablegram of the President to retail grocers of the Kingdom assisted materially in restoring confidence in American meats. Notwithstanding the general hue and cry against canned meats the American article has come out comparatively unscathed from all tests made. For instance, in Stepney, where an average of one ton a day of tinned goods has been condemned for five years past, only a very small quantity of American meats were included. Indeed, the sudden falling off in the sale of canned goods during the summer was due as much to English exposures as to the news from America.

The Crime of the Railroads.

Mr. Roosevelt's hatred of the railroads, which has reached the proportions of an intellectual obsession, bids fair to bear substantial fruit in the not distant future. Indeed, it is quite certain that we shall all have to pay deeply for the sins of the railroads.

The prospective penalty impresses us as being too inclusive. We favor the severest punishment for the crime of secret and fraudulent rebating, which we take to be the root and genesis of the whole evil. We should be content to see the giver and the receiver of the dishonest rebate both fined and sent to prison as a just penalty and deterrent, and we sincerely deplore the laxity and inefficiency with which the statutes have been enforced.

The public has now had time for reflection and perceives the unreasonableness if not the dishonesty of rate regulation as a remedy for malpractice. However much astray the public may be led by clamor and sophistry, it will not always remain misled, and it will very soon be aware that there is no connection between rate regu-

lation and criminal rebating. In the long run common sense will settle all such questions, because it is at the bottom of public opinion, and public opinion is still the governing power in this country.

The transportation rates of the United States are the lowest in the world and are a scientific wonder. They have been achieved by the railroads themselves without any legislation or Government interference. There is no page in the history of commerce that is so wonderful as that which records the fall in the cost of railroad transportation during the last thirty-five years. Natural causes brought it about, and if natural causes are not checked in their operation by fatuous and ignorant meddling rates will go lower yet. If they are checked, and there is a reckless and mischievous effort now on foot to do so, then disaster will ensue as surely as the night follows the day, and with disaster will come increased cost of transportation.

The last quarter of the year has seen over $100,000,000 added to the wages of railroad employees. (Likewise the greatest decrease in the efficiency of labor ever noted in this or any other country.) The record of the prices of railroad supplies, rails alone excepted, during the year shows the greatest advance ever known in a like period. The condition of all around apparent prosperity is the most ominous disclosed in our annals.

In these conditions a 10 per cent. horizontal reduction in rates of transportation by the joint forces of the Interstate Commerce Commission and special enactment is proposed, and it suggests at once to the sane and competent observer that Mr. Bryan's idea of Government ownership of all the railroads was wiser and more equitable and implied a decenter regard for the rights of property. It would seem as if the intention was to go Mr. Bryan one better, or go him one worse.

In the face of this menace, what are the railroads to do? Where are they to get the money to buy the additional trackage, the need of which is now so painfully apparent; the money for additional rolling stock; the money for more motive power, and the money for enlarged terminals? The pressure to acquire all these is the most acute that has ever existed in our railroad history. How can the money be forthcoming in the presence of the destructive plans of the Federal Government? What is the prospect for the wage earners? As a highly privileged class they have some interest in knowing whence these things are to come. The apparent prosperity of the present must give way before the certain paralysis of the railroads. As it is, we see no signs of building the new trackage. Indeed, we are disturbed by the ominous fact that in spite of the well known and obvious conditions the market for steel rails is slackening. It could not possibly do so if the railroads were doing what under normal circumstances they could have no choice but do.

The outlook for the railroads is serious. Such a clamor was never before heard as has arisen for more cars. Consignees won't unload the cars sent to them, and there is no way to compel them to do so. Indeed, some State Railroad Commissioners, quick to emulate Mr. Roosevelt's example, forbid the railroads from imposing demurrage charges for delay. The roads are between Mr. Roosevelt and the deep sea. The gross earnings are suffocating them, the net earnings are steadily vanishing, and behind all is the spectre of an intolerable usurpation which means only bankruptcy and disaster. Communities are howling for coal; farmers are distracted for means to get their grain to market; merchandise of all kinds encumbers the sidings and chokes the railroad yards, and only open weather palliates the immediate prospect.

But never mind the railroads. They have earned and they fully deserve the punishment that is coming to them. If the laws are not enforced we must make new laws. But what we want to know is, How does a paternal and illustrious ruler propose to provide for the unemployed millions who will presently appeal to his omnipotence for succor?—*New York Sun.*

An Antagonistic Government.

The cost of operating and maintaining railroads has been increasing with leaps and bounds. To add to the anxiety, the owners of railroad properties are threatened with loss, possible confiscation, by the people who are to an extent debauched by the leaders, who, for selfish reasons, denounce corporations, especially railroad corporations, falsely charging them with ruling the country.

The attitude of the Government and its administrators is antagonistic to railroads. President Roosevelt has in two annual messages to Congress sharply criticised two of the Federal judges, a coordinate department of Government, because they have, in the performance of their duties, rendered decisions unsatisfactory to him. He and the Department of Justice have in effect pursued a course of intimidation not heretofore attempted.

When it is considered that the President appoints the judges, which includes their promotion, it is not too much to characterize his conduct as dastardly. His plaint is that the government has not the right of appeal and that the decisions which he denounces were final. Are the judges at fault because the laws of the country do not provide for an appeal in criminal cases? As I am advised, since the creation of the government the law has been that a man accused of crime and acquitted cannot be again tried for the same offense. The justice of such a law will not, I think, be denied.—*Milton H. Smith, President of the Louisville & Nashville, in a speech at New Orleans.*

Government Regulation.

"Where's the president of this railroad?" asked the man who called at the general offices.

"He's down in Washington, attendin' th' sessions o' some kind uv an investigatin' committee," replied the office boy.

"Where's the general manager?"

"He's appearin' before th' Interstate Commerce Commission."

"Well, where's the general superintendent?"

"He's at th' meetin' o' th' Legislature, fightin' some new law."

"Where's the head of the legal department?"

"He's in court, tryin' a suit."

"Then, where is the general passenger agent?"

"He's explainin' t' th' commercial travelers why we can't reduce th' fare."

"Where is the general freight agent?"

"He's gone out in th' country t' attend a meetin' o' th' grange an' tell th' farmers why we ain't got no freight cars."

"Who's running the blame railroad, anyway?"

"Th' newspapers."—*Pittsburg Press.*

Nine Passengers Killed in Mexico.

Press despatches of December 19 report the wreck of a passenger train on the Mexico Southern Railroad near Tlacotepac in which nine passengers and two trainmen were killed and 20 passengers injured.

Ten Persons Killed in a Collision at Enderlin, N. Dak.

On the morning of December 23 about 2 o'clock, a passenger train of the Minneapolis, St. Paul & Sault Ste. Marie Railway collided with a switching engine in the yard at Enderlin, N. Dak., and several of the passenger cars were overturned and wrecked. The wreck took fire and was burnt up. Ten persons were killed and 30 more injured, six of them fatally. It is said that the switching engine, with a few freight cars attached, was leaving the main track for a siding, but had not quite cleared it. All of the injured persons were rescued before the flames reached them. All of the fatalities occurred in the smoking car.

Government Prescribing Forms of Railroad Records.

Prof. Henry C. Adams, chief statistician of the Interstate Commerce Commission, has issued his first circulars looking to the preparation of a complete schedule, under authority of the revised interstate commerce law, for the guidance of railroads in keeping the records of all their doings. They are circulars 1 and 2, "special report series," requiring full and correct information concerning intercorporate relationship. Circular 1 is addressed to controlling or operating companies and circular 2 to subsidiary companies. The information is required to be furnished under oath. It may be classified as covering, first, every corporation in which on June 30, 1906, the company had any interest and which on that date had existence in contemplation of law, even though the corporation was then inactive; second, every corporate security, whether the said interest was legal or equitable, complete or partial, absolute or qualified. The circulars define certain terms, the object of which terms is to make clear what is included under the term "control" and what is the difference between direct and indirect control.

Profit Sharing.

The employees of the Bourne Mills, Fall River, Mass., have just received their 34th semi-annual dividend. It is four per cent. of their wages. Treasurer Chace says to the employees: "I sincerely hope there may never be another reduction of wages here. There ought not to be. The business should be adjusted to this schedule." The Board of Directors has unanimously authorized him to announce the experiment of a vacation week in August, 1907. The mills will close Saturday noon, August 24, and reopen Tuesday morning, September 3, thus allowing ten days of rest and recreation. In lieu of regular pay employees will receive an extra dividend upon their wages, payable just before the vacation, of 50 per cent. of the average weekly wages earned during the present profit sharing term, closing next June. These dividends are paid upon the single condition of continuous faithful efficient service. The August dividend will be in addition to the regular Fourth of July dividend.

A Santa Claus Train.

Henry K. McHarg, President of the Virginia & Southwestern Railway, having sold out his interest in the property, gave to the employees this week farewell gifts aggregating nearly $50,000 in cash. Heads of departments each received a check equal to one year's salary, while all other employees received the equal of one month's pay. The company sent a special train to deliver the checks to the men along the road. The conductor was attired as

Santa Claus and the train was designated in orders as the "Santa Claus train." A feature of its trip was the presentation of stockings full of toys to children of the section men.

This is the second time in recent years Mr. McHarg has distributed thousands of dollars in presents among his employees. When he sold the Atlanta, Knoxville & Northern, he presented his manager, John B. Newton, with $25,000. Mr. Newton received a liberal gift this time, too.

The Salton Sea Still Unsubdued.*

Early in December the Colorado River again broke through the barriers which had been built to keep its waters out of the Imperial Valley, Southern California, and the Southern Pacific Company has again taken up the task of building a dyke which will stand. It is estimated that the work will cost $2,500,000. The $1,000,000 or more heretofore spent appears to have been all thrown away. Over 1,000 piles were driven and 100,000 sacks of sand used, as well as a great quantity of gravel and brush, and the flood, which had been pouring into the Salton sink for 18 months, was stopped on November 4; but now the work must be done over again. It appears that at a depth of 10 feet or more beneath the surface there are immense masses of driftwood through which water percolates. President Roosevelt has been negotiating with the Mexican Government with a view to having the United States Reclamation Service take a hand in the work of restoration, most of which has to be done on the Mexican side of the boundary. Mr. Harriman says that the Southern Pacific Company has determined to rebuild its railroad line on higher ground, whatever may be done about stopping the rise of the Salton Sea. Although the Southern Pacific is not responsible for the acts of the California Development Company, which caused the original trouble, he will proceed at once with efforts to repair the break, trusting that the Government will later decide to assist the road with the burden.

Proposed New Bill of Lading.

At a two-day conference recently held in New York a formal decision on a uniform bill of lading was reached by the joint committee of shippers and railroad men appointed at the suggestion of the Interstate Commerce Commission two years ago. The wording will be revised for the purpose of correcting language that might be subject to indefinite construction, and the bill will be again considered early in January. The committee consists of Levy Mayer, counsel; A. J. Toomey, of the New York Produce Exchange, and F. Bently, of the Illinois Steel Company, representing shippers, and Vice-President Caldwell, of the Lackawanna; Mr. Brownell, of the law department of the Erie; Mr. Paterson, of the law department of the Pennsylvania, and Commissioner McCain, of the Lake Lines Association, representing the railroads.

The new bill does not carry out in full the ideas of the Bill of Lading Committee of the American Bankers' Association. There seems to be sharp antagonism between the railroads and the bankers. Some of the banks presenting drafts attached to bills of lading are protecting themselves by printing on them the following by means of a rubber stamp:

> The . . . bank hereby notifies all parties concerned that it will not be responsible for quantity, quality, condition or delivery of goods covered by this bill of lading or otherwise.

The reason this stamp is being used, it is understood, is that courts in certain states have decided that banks presenting drafts are liable for the quality and quantity of shipments, although acting merely as collection agents. Bankers at a recent conference with the Interstate Commerce Commission were especially anxious to have the bills made uniform by law, and to have at least a partial quality of negotiability bestowed upon them. They also are very urgent that the present law shall be altered so that they will be able to take possession of consignments when obliged to realize upon the security, even though the goods may have been falsely described in the bill of lading. At present, if there be an error in the bill of lading the banks have no legal title even to the consignment, such as it is, though they may have been misled as to its nature when they granted credit on the strength of it. They are still anxious to have the rules of law relating to the delivery of bills of lading made more stringent.—*New York Journal of Commerce.*

Alaska-Yukon-Pacific Exposition.

The Alaska-Yukon-Pacific Exposition is to be held in Seattle, Wash., beginning June 1, 1909, and closing October 15 of that year. The company in charge of it was incorporated several months ago, and $650,000 capital stock has been subscribed to. J. C. Olmsted, who laid out the Chicago and Portland expositions, is now at work on the arrangement of the buildings. The purpose of the fair is to exploit the resources of Alaska, Yukon and the Northwest. It is to show what things Alaska can produce aside from gold. It is estimated that the fair will cost $10,000,000, and the United States Government and the state of Washington are to appropriate one-fourth of this amount; it is expected that the remainder will be made up by appropriations by other states and by concessions to exhibitors. The fair is to be held on the campus of Washington University, and many of the buildings are to be permanent, remaining the property of the University.

*The flooding of the Salton Sink, Southern California, was described in the *Railroad Gazette*, Aug. 17, page 144, and an account of the reclamation work in the issue of Nov. 9, page 420.

Great Northern Stock Issue Enjoined.

The state of Minnesota, through E. T. Young, Attorney-General, on December 26 filed injunction proceedings in the district court at St. Paul to restrain the Great Northern Railroad from making its proposed $60,000,000 stock issue, recently announced, until the company shall have applied to the State Railroad and Warehouse Commission and procured its consent.

The Attorney-General, after reciting the fact that the Great Northern is a corporation of the state of Minnesota and that its original authorized capital stock was $30,000,000, that being the limit fixed by its charter, says:

> "That between Feb. 1, 1890, and Mar. 1, 1906, the defendant made several large increases of its capital stock, until on Mar. 1, 1906, its capital stock aggregated substantially $150,000,000.
>
> "That all these increases were made without application for the consent of the Railroad and Warehouse Commission, as required by statute.
>
> "That prior to December, 1906, the defendant decided to increase its capital stock to $210,000,000, by an additional issue of $60,000,000, notice of which was served on its stockholders by its president, James J. Hill, who invited them all to subscribe for their pro rata share.
>
> "If the defendant increases its stock as now proposed the aggregate thereof will be $210,000,000; that the defendant has been and it is now paying annual dividends at the rate of 7 per cent. on all of its capital stock, and will pay dividends at the same rate on all of its present capital stock if this increase is consummated as now intended; that this increase of $60,000,000 if effected will therefore increase the fixed annual charges of the defendant by the sum of $4,200,000, a greater portion of which will have to be paid by the defendant's Minnesota patrons as charges on freight and passenger traffic local to Minnesota; and that it is further alleged that if these plans are consummated they will be effected without the surveillance or the consent of the State of Minnesota."

TRADE CATALOGUES.

Electric Motors and Equipment.—Recent bulletins of the General Electric Company are as follows: No. 4473, describes the type GE 81 railway motor; No. 4466 is devoted to remote control field rheostats for railway generators and rotary converters; No. 4470 describes and illustrates electric motors for saw mill work; No. 4467 describes in detail the emergency straight air brake system.

Mines and Quarry.—The November issue of *Mines and Quarry*, published by the advertising department of the Sullivan Machinery Co., Chicago, contains an article on the progress of the building of the Tidewater Railway, with particular attention to the tools and methods used in the open cut and tunnel work on that road.

Mercury Vapor Lamps.—The Cooper-Hewitt Electric Co. sends a pamphlet showing different styles of mercury vapor lamps for direct current and for alternating current as well as interior views of factories and other plants where these lamps are used.

Drills.—The November issue of *Ideal Power*, published in the interest of the Chicago Pneumatic Tool Co., has an interesting article on the relative efficiency and cost of gas engines, followed by a bibliography intended to act as a guide for further study on the subject.

Roofing.—F. W. Bird & Son, East Walpole, Mass., makers of Paroid roofing, sends a neat colored blotter referring to a large order for Paroid for buildings at Newport News, Va.

William E. Hoyt, Patent Sales Specialist, 290 Broadway, New York, issues a pamphlet describing the methods of placing patents in the market.

Manufacturing and Business.

John C. Sesser, Engineer of Construction of the Chicago, Burlington & Quincy, has resigned to become General Superintendent of the E. S. Johnson Co., Davenport, Iowa, with office at Norris City, Ill.

The New York, New Haven & Hartford has bought, for $350,000, the property of the Consolidated Gas Company on Commercial street, Boston. The railroad plans extensive dock building on the property as a terminal for its steamship lines.

Robert M. Burns & Co., Chicago, have sold 20 gondolas, of 80,000 lbs. capacity, and five tank cars to the American Car & Equipment Company; five tank cars to the Alfalfa Meal Co.; one American (4-4-0) type locomotive to the Chicago Mill & Lumber Co.; 16 tank cars to the Union Oil Co. of California; 6 tank cars to the Louisville Cotton Oil Co.; 25 flat cars to the Pan-American Railroad, and

100 tons of rails, five flat cars and one box car to the Engle Land & Lumber Company.

George M. Basford has been made Assistant to the President of the American Locomotive Co. Mr. Basford's identity with railroad work dates back to July, 1889, when he entered the Charlestown (Boston) shops of the Boston & Maine. The following year he left to go with the Chicago, Burlington & Quincy as draftsman. Between that time and February, 1895, when he became an Editor of the *Railway and Engineering Review*, Mr. Basford served in the motive power department of the Union Pacific and Chicago, Milwaukee & St. Paul. In May, 1897, Mr. Basford was appointed Editor of the *American Engineer and Railroad Journal*, and stayed there until placed in charge of the Publicity Department of the American Locomotive Co., Sept. 1, 1905.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies, see advertising page 24.)

Railway Signal Association.

The next meeting of this Association will be held at the Grand Union Hotel, New York, at 10 a.m., Tuesday, January 8. The subjects for discussion are those left unfinished at the October meeting in Washington, principally the following; and they are scheduled by hours, as follows:

10 a.m. to 11 a.m. D.—"How to remedy the effects of Foreign Currents on Automatic Block Signals."

11 a.m. to 1 p.m. H.—"Committee on Interlocking and Block Signals."

2.30 p.m. to 3.30 p.m. L.—"Circuits for Interlocked Signals."

3.30 p.m. to 4.30 p.m. A.—"General Specification for Electric Interlocking."

Members desiring to take part in the discussion of any particular subject are requested to hand their names to the presiding officer before such discussion begins. Members are requested to bring copies of the reports.

A number of requests have been made by members to have their 1906 Proceedings bound in cloth, and the Executive Committee has decided to provide a limited edition. These will be sold to members at 70 cents each, including postage. Remittance should be made to Secretary C. C. Rosenberg. Bethlehem, Pa., before January 8, so that he may know what members desire the cloth instead of the paper covered volume.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Alabama Great Southern.—See Cincinnati, New Orleans & Texas Pacific.

Cincinnati, New Orleans & Texas Pacific.—W. W. Finley, President of the Southern, has been elected also President of the C., N. O. & T. P., and the Alabama Great Southern.

M. F. Molloy, Auditor, has been appointed Comptroller of both roads. R. F. Heath succeeds Mr. Molloy. The offices of both are at Cincinnati, Ohio.

Denver & Rio Grande.—D. E. Cain, General Manager of the Southwestern and Choctaw districts of the Chicago, Rock Island & Pacific, has been appointed Assistant to the Vice-President in charge of operation of the D. & R. G., effective January 1.

Norfolk & Southern.—M. J. Perry, President, has been elected Chairman of the Board. F. S. Gannon, Vice-President, has been elected President, with office at New York. M. K. King and G. W. Roper, both of Norfolk, Va., and C. O. Haines, of Raleigh, N. C., are Vice-Presidents.

Pennsylvania.—Henry C. Frick has been elected a Director, succeeding Amos R. Little, deceased.

Operating Officers.

Atlantic Coast Line.—Five new operating districts have been created, making 17 in all, and officers appointed, as follows, effective January 1: Wilmington, N. C., district, E. Phenneger, Superintendent, B. J. Hughes, Trainmaster; Chadbourne, S. C., district, J. A. Fountain, Superintendent, M. L. Stover, Trainmaster; Columbia, S. C., district, C. L. Porter, Superintendent, B. T. Jones, Trainmaster; Darlington, S. C., district, B. H. Hare, Superintendent, M. A. Cole, Trainmaster; Norfolk district, George B. McClellan, Superintendent, and C. M. Brand, Trainmaster. W. M. Dove, Trainmaster of the Charleston & Northern Carolina at Augusta, has been appointed Superintendent of the Savannah district, succeeding W. H. Wright, resigned to go to the Central of Georgia.

Canadian Pacific.—D. E. Brown has been appointed General Superintendent of this company's trans-Pacific steamship service, with office at Vancouver, B. C.

Chicago Great Western.—J. P. Houston, chief train despatcher of the Northern division, has been appointed Trainmaster at St. Paul, Minn., succeeding C. R. Johnston.

Chicago, Rock Island & Pacific.—See Denver & Rio Grande, under Executive, Financial and Legal Officers.

New York Central & Hudson River.—The Western division is to be operated after January 1 in three divisions, as follows: The Buffalo division consists of the main line from Depew, N. Y., west to Buffalo, including the terminals at that place and branch lines. L. H. Van Allen, Superintendent of Terminals at Buffalo, has been appointed Superintendent in charge of this division. The Western division will consist of the main line from Syracuse to Depew, and the West Shore line from Syracuse to East Buffalo. F. W. Everett, now Superintendent of the Western division, will be Superintendent of the new Western division, with office at Syracuse. The Rochester division will comprise the "Falls Road" from Suspension Bridge, N. Y., to Rochester, and the Auburn branch from Rochester to Syracuse, the Charlotte branch from Rochester to Charlotte, and the branch from North Tonawanda to Canandaigua. S. R. Payne, Assistant Superintendent at Syracuse, will be Superintendent of the Rochester division.

Southern.—E. T. Lamb, general agent at Norfolk, Va., has been appointed Superintendent of the Norfolk division.

Southern in Mississippi.—H. H. Thatcher, Secretary to the Vice-President, has been appointed Assistant Superintendent.

Traffic Officers.

Alabama Great Southern.—See Cincinnati, New Orleans & Texas Pacific.

Bangor & Aroostook.—G. M. Houghton, general agent at Stockton Harbor, Me., has been appointed, effective January 1, Passenger Traffic Manager, succeeding to the duties of C. C. Brown, heretofore General Passenger and Ticket Agent, resigned to go to another company.

Cincinnati, New Orleans & Texas Pacific.—E. J. Lythe, Chief Clerk to the General Passenger Agent, has been appointed Assistant General Passenger Agent of this road and of the Alabama Great Southern.

Great Northern.—Archibald Gray, Assistant General Passenger and Freight Agent at Sioux City, Iowa, has been appointed Assistant General Freight Agent at Seattle, Wash., effective January 1.

Lehigh & New England.—T. J. Fretz, division freight agent of the Lehigh Valley at South Bethlehem, Pa., has been appointed General Freight and Passenger Agent of the L. & N. E.

Lehigh Valley.—A. W. Nonnemacher, General Baggage Agent, has, at his own request, been relieved from active duty and appointed Special Passenger Agent, reporting to the General Passenger Agent. G. W. Hay succeeds Mr. Nonnemacher, with office at South Bethlehem, Pa., effective January 1.

Engineering and Rolling Stock Officers.

Alabama Great Southern.—See Cincinnati, New Orleans & Texas Pacific.

Atchison, Topeka & Santa Fe.—H. W. Jacobs, engineer of shop methods and tools, has been appointed Assistant Superintendent of Motive Power of the Atchison, Topeka & Santa Fe System. Mr. Jacobs was for seven years an apprentice in machine shop, boiler, foundry and structural iron work; he spent three years as a journeyman machinist in marine engine work. After spending some years in the Sprague Electric Co., R. Hoe & Co., Crocker-Wheeler Co. and other shops, he went to the Chicago, Burlington & Quincy as a machinist. He was made roundhouse foreman on this road, and then went into the Union Pacific shops at Omaha, where he was made general tool room foreman, and, soon after, general shop demonstrator. He went to the Atchi-

H. W. Jacobs.

son, Topeka & Santa Fe in 1904 to take the position from which he has recently been promoted.

Cincinnati, New Orleans & Texas Pacific.—H. E. Warrington, Principal Assistant Engineer, has been appointed Chief Engineer, with office at Cincinnati, Ohio, succeeding G. B. Nicholson, deceased. J. C. Nelson, Division Engineer of the Alabama Great Southern at Birmingham, Ala., has been appointed Assistant Chief Engineer, with office at Cincinnati, Ohio, of the C., N. O. & T. P. and the Alabama Great Southern.

Lehigh Valley.—See New York, New Haven & Hartford.

New York, New Haven & Hartford.—E. T. James, Superintendent of Shops of the Lehigh Valley at Sayre, Pa., has been appointed Master Mechanic of the New York, New Haven & Hartford at New Haven, Conn.

Purchasing Agents.

Lake Shore & Michigan Southern.—See New York Central Lines.

Mexican Central.—W. Till, Assistant Purchasing Agent, has resigned.

New York Central Lines.—F. H. Greene, Purchasing Agent of the Lake Shore & Michigan Southern, has been appointed General Purchasing Agent of all New York Central Lines, with office at New York City, effective January 1.

LOCOMOTIVE BUILDING.

The Atlantic Coast Line is about to order 80 locomotives.

The Harrisburg & Ohio River will shortly contract for locomotives through D. E. Baxter & Co., New York.

The Peru Southern is about to contract for several locomotives through W. R. Grace & Co., 1 Hanover Square, New York City.

The Morelia & Tacambaro will shortly be in the market for several locomotives. The New York address is A. J. Peyton & Company, 111 Broadway.

The Chicago, Burlington & Quincy, as reported in our issue of December 21, has ordered 50 simple Prairie (2-6-2) type locomotives and 15 simple Pacific (4-6-2) type locomotives from the American Locomotive Company. The specifications are as follows:

General Dimensions.

Types of locomotive	Prairie	Pacific
Weight, total	216,000 lbs.	228,000 lbs.
Weight on drivers	152,000 lbs.	150,000 lbs.
Diameter of drivers	69 in.	74 in.
Cylinders	22 in. x 28 in.	
Tank capacity	8,000 gals.	
Coal capacity	13 tons	

The Las Vegas & Tonopah has ordered three simple ten-wheel (4-6-0) type locomotives from the Baldwin Locomotive Works for February, 1907, delivery. The specifications are as follows:

General Dimensions.

Type of locomotive	Ten-wheel
Weight, total	187,000 lbs.
Weight on drivers	142,000 lbs.
Diameter of drivers	57 in.
Cylinders	21 in. x 26 in.
Boiler, type	Wagon top
" working steam pressure	200 lbs.
" number of tubes	303
" diameter of tubes	2 in.
" length of tubes	15 ft. 5½ in.
Firebox, length	90 in.
" width	66 in.
" grate area	43 sq. ft.
Heating surface	2,958 sq. ft.
Tank capacity	6,000 gals.

The Chicago, Milwaukee & St. Paul, as reported in our issue of December 14, has ordered two balanced compound Atlantic (4-4-2) locomotives from the Baldwin Locomotive Works. The specifications are as follows:

General Dimensions.

Type of locomotive	Atlantic
Weight, total	About 193,000 lbs.
Weight on drivers	About 107,000 lbs.
Diameter of drivers	85 in.
Cylinders	15 and 25 in. x 28 in.
Boiler, type	Extended wagon top
" Working steam pressure	220 lbs.
" number of tubes	270
" diameter of tubes	2¼ in.
" length of tubes	19 ft.
Firebox, length	102 in.
" width	66 "
" grate area	46 sq. ft.
Heating surface, total	3,182 "
Tank, capacity	7,000 gals.
Coal capacity	10 tons.

Special Equipment.

Bell ringer	Golmar
Boiler lagging	Magnesia
Brake-beams	Monarch
Injector	Nathan and Simplex
Piston rod packings	Edwards metallic
Valve rod packings	Edwards metallic
Safety valve	Richardson
Sanding devices	Leach
Sight-feed lubricators	Nathan Bull's-eye

The Delaware & Hudson has ordered from the American Locomotive Co. 15 simple ten-wheel (4-6-0) locomotives and five simple switching (0-6-0) locomotives. The specifications are as follows:

General Dimensions.

	Ten-wheel.	Switching.
Type of locomotive	Ten-wheel.	Switching.
Weight on drivers	134,800 lbs.	140,000 lbs.*
Total weight	186,000 lbs.	140,000 lbs.*
Diameter of cylinders	21 in.	19 in.
Stroke of pistons	26 in.	24 in.
Diameter of drivers	63 in.	51 in.
Boiler, type	Wooten.	
" wkg. stm. pressure.	200 lbs.	180 lbs.
Boiler tubes, No.	About 308	270
" material & maker.	Steel (Shelby for 8 engines). Worth Bros. for 7 engines.	Spellerized.
" outside diameter	2 in.	2 in.
" length	15 ft.	11 ft. 5¼ in.
Firebox, length	119⅞ in.	106 in.
" width	102 in.	96 in.
" grate area	84.85 sq. ft.	74.0 sq. ft.
Heating surface, total	2,583.9 sq. ft.	1,785.32 sq. ft.
Tank capacity	6,800 gals.	4,200 gals.
Coal capacity	13½ tons.	8 tons.

Special Equipment.

Bell ringer	Sansom
Boiler lagging	Magnesia sectional, Keasbey & Mattison
Brake-beams	Simplex
Brake-shoes	Perfecto
Couplers	Gould
Headlights	Dressel
Injector	Hancock, for switching and 10 ten-wheelers; Sellers Composite for 5 ten-wheelers
Piston rod packings	Trojan
Valve rod packing	Trojan
Safety valve	Consolidation for ten-wheelers
Sanding devices	Leach
Sight-feed lubricators	Nathan
Springs	National
Steam gages	Ashcroft
Steam heat equipment	Consolidated, for ten-wheelers
Tire, driving wheel	Midvale
" truck wheel	Midvale
" tender wheel	Midvale

CAR BUILDING.

The Union Pacific is in the market for 500 furniture cars.

The Norfolk & Western is about to build 1,500 freight cars at its Roanoke shops.

The Pennsylvania has ordered 2,000 box cars from the American Car & Foundry Co.

The Pan-American has ordered 25 flat cars from Robert M. Burns & Co., Chicago.

The Temiskaming & Northern Ontario, it is reported, is in the market for a number of cars.

The Georgia Railroad is asking prices on 500 freight cars, including stock, flat and box cars.

The Georgia Northern is figuring on two coaches, one baggage car and some freight equipment.

Argentine Railroads have ordered 25 box and 25 gondola cars from the Middletown Car Works.

The Gulf & Ship Island has ordered about 300 freight cars from the American Car & Foundry Co.

The Atlantic Coast Line is about to place orders for 3,250 freight cars and 50 passenger cars.

The Nashville, Chattanooga & St. Louis has ordered 500 box cars from the American Car & Foundry Co.

The Peru Southern is about to place contracts for several cars through W. R. Grace & Co., 1 Hanover Square.

The Harrisburg & Ohio River will shortly place a contract for several cars through D. E. Baxter & Co., New York.

The Seattle Electric Company has ordered ten 36-ft. flat cars of 50,000 lbs. capacity from the Hicks Locomotive & Car Works.

The Stratford Railway Construction Co., Lima, Ohio, has ordered 20 ballast cars from the Hicks Locomotive & Car Works.

The McCloud River has ordered one combination observation and sleeping car, with buffet, from the Hicks Locomotive & Car Works.

The Seaboard Air Line is building at its Portsmouth shops 250 flat cars of 60,000 lbs. capacity; these cars will measure 40 ft. long, and 8 ft. 11 in. wide, over all. Bodies and underframes will be of wood. The special equipment includes: Farlow draft gear, Symington journal boxes and Tower couplers; other special equipment will be Seaboard Air Line standard.

The United Verde & Pacific, as reported in our issue of Decem-

ber 21, has ordered 20 wooden flat cars of 50,000 lbs. capacity from the Pullman Company for March, 1907, delivery. These cars will measure 26 ft. long, 7 ft. wide and 4 ft. high. The special equipment includes:

Axles	Pullman
Bolsters	American Steel Foundry
Couplers	Janney
Journal boxes	McCord

The Chicago, Milwaukee & St. Paul will build 1,000 box cars of 80,000 lbs. capacity at its West Milwaukee shops. These cars will be 41 ft. long, 8 ft. 6 in. wide and 8 ft. 8½ in. high, inside measurements. The special equipment includes:

Bolsters	Bettendorf
Brake-beams	Wood "Trussed"
Brake-shoes	Congdon
Brasses	Hewitt
Door fastening	Western car
Doors	Security
Draft rigging	Westinghouse
Roofs	Chicago Improved Winslow
Trucks	Bettendorf

The Duluth, Missabe & Northern has ordered 1,150 steel hopper cars from the Pressed Steel Car Co. and 600 steel hopper cars from the Standard Steel Car Co., all of 100,000 lbs. capacity, for May and June, 1907, delivery. All cars will weigh 32,000 lbs. and measure 24 ft. long, over all; 8 ft. 6 in. wide and 9 ft. high, inside measurements. The special equipment for all includes:

Axles	Carnegie
Bolsters	Simplex
Brake-beams	Pressed steel
Brake-shoes	Streeter
Brakes	Westinghouse
Brasses	Duluth Brass Works
Couplers	Latrobe, Climax, Major and R. E. Janney
Draft rigging	Westinghouse friction
Journal boxes	Symington and McCord
Paint	Illinois Steel Co.
Springs	Railway Steel-Spring Co.
Trucks	Arch bar
Wheels	Griffin

The Indianapolis, New Castle & Toledo Electric, as reported in our issue of December 7, has ordered through the Electrical Installation Co., Chicago, eight interurban and two express cars from the Jewett Car Co., for May, 1907, delivery. The interurban cars will weigh 80,000 lbs., and measure 60 ft. 8 in. long and 9 ft. 3 in. wide, over all; height of body, 9 ft. 9 in. The express cars will measure 50 ft. long and 9 ft. wide, over all; height of body, 9 ft. 6 in. The special equipment for both includes:

Brakes	Christensen
Brasses	Streeter
Couplers (for interurban cars)	Van Dorn
Curtain fixtures (for interurban cars)	Curtain Supply Co.
Curtain material (for interurban cars)	Pantasote
Heating system (for interurban cars)	Peter Smith
Journal boxes	Symington
Seats (for interurban cars)	Hale & Kilburn
Trucks	Baldwin
Wheels	Standard Steel Works

The Delaware & Hudson has ordered six passenger cars from Barney & Smith, and 20 passenger coaches, five baggage cars and three horse cars from the American Car & Foundry Co. The cars ordered from Barney & Smith will measure 70 ft. long over end sills and 9 ft. 8 in. wide over side sills. Bodies and underframes will be of wood. The other passenger cars will be 61 ft. long over end sills and 9 ft. 8 in. wide over side sills, with wooden bodies and steel underframes. The baggage cars will measure 60 ft. long, 9 ft. ¼ in. wide and 7 ft. 6⅛ in. high, inside measurements, and 60 ft. 11¾ in. long, 9 ft. 9¾ in. wide and 13 ft. $10^{7}/_{16}$ in. high, over all. Bodies will be of wood and underframes of steel. The horse cars will measure 65 ft. long and 9 ft. ¼ in. wide, inside measurements, and 65 ft. 11 in. long and 9 ft. 9¾ in. wide, over all; they will have wooden bodies, steel underframes, folding doors, and the interior will be divided into 18 stalls. The special equipment includes:

Axles	Cambria Steel Coffin Process (all except horse cars)
Brake-beams	Simplex
Brake-shoes	Diamond S (all except horse cars)
Couplers	Gould (Am. C. & F. coaches)
Curtain material	Pantasote (Am. C. & F. coaches)
Draft rigging	Gould (all passenger cars)
Dust guards	Symington (Am. C. & F. coaches)
Heating system	Consolidated (passenger and baggage cars)
Journal boxes	Symington (all except Barney & Smith cars)
Light	Pintsch
Paint	D. & H. Standard (Am. C. & F. coaches)
Platforms	Gould
Side bearings	Miner (baggage and horse cars)
Springs	Railway Steel-Spring Co. (all except horse cars)
Trucks	4-wheel pedestal (Am. C. & F. coaches and baggage cars); 6-wheel (Barney & Smith cars)
Vestibules	Gould (passenger cars)
Wheels	Paige steel-tired (all except horse cars)

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALABAMA RAILWAY & POWER COMPANY.—Incorporation has been granted a company under this name in Alabama to build a line from Chattanooga through Albertville, Hamilton County, Tennessee, and Dade County in Georgia, and Jackson, DeKalb, Blount, St. Clair and Jefferson counties in Alabama, to Birmingham. The incorporators include H. T. Henderson, of Durango, Colo.; J. P. Montgomery, of Ashville, Ala., and C. L. Young, Jr., of Fort Payne, Ala.

ATCHISON, TOPEKA & SANTA FE.—The Denver, Enid & Gulf, which has been extended to Sun City, Kan., is under construction from the latter place to Belvidere, 10 miles.

BALTIMORE & OHIO.—This company during the year 1906 has laid second, third and fourth track on its various divisions as follows: Baltimore division, second track between Gaithersburg, Md., and Germantown, Md., 4.19 miles; and second track between Barnesville, Md., and Dickerson, Md., 2.59 miles. Wheeling division, second track at Wheeling, 0.30 miles; and second track, Bridgeport, Ohio, yard, 2.61 miles. Cleveland division, track improvements at Lorain, Ohio, yard, etc., 5.71 miles; track improvements at Cleveland, Ohio, yard, etc., 19.74 miles. Newark division, third track between Central City, Ohio, and Outville, Ohio, four miles; and from Summit to Big Walnut, third track, five miles. Connellsville division, first track, relocation of approach to new F., M. & P. bridge, near Fairmont, W. Va., 2.54 miles; and first track on Hickman Run branch, .85 miles. Pittsburg division, third and fourth track between Wheeling Junction and Rankin, Pa., 4.65 miles; and third and fourth track between Braddock, Pa., and Dexter, Pa., 0.32 miles. New Castle division, second track between Sterling, Ohio, and Nova, Ohio, 7.52 miles. Chicago division, second track between Avilla, Ind., and Cromwell, Ind., two miles. Ohio division (B. & O. S. W. R. R.), second track between Madeira, Ohio, and O'Bannon, Ohio, 7.40 miles; and second track from Byers Junction, Ohio, to West Junction, Ohio, 8.10 miles. Sidings have been built aggregating 10.20 miles.

BEAVERTON & WILLSBURG.—See Southern Pacific.

BROXTON AIR LINE.—An officer writes that this company, which is being organized in Georgia, will not let contracts earlier than next summer for the work. The proposed route is from Broxton via McRae to Helena, about 30 miles, and will cross the Ocmulgee at Barrow's Bluff, 11 miles north of Broxton, where a drawbridge is to be built. The company may buy 11 miles of existing road from Broxton to the river. W. R. Frier, of Broxton, Ga., is President. (Dec. 7, p. 160.)

CHICAGO & NORTH-WESTERN.—On the Chicago and State Line and the Milwaukee & State Line Railroads this company has laid third and fourth tracks during the present year northbound 28.65 miles, and southbound 26.02 miles, between Lake Bluff, Ill., and St. Francis, Wis.

CHICAGO & WABASH VALLEY.—This company is building an extension of its road from Dunwiddie, Ind., the present terminus, to Gary, 20 miles, and is making surveys from Dunwiddie to Crown Point.

CHICAGO, BURLINGTON & QUINCY.—This company has given contracts to the Kilpatrick Bros. & Collins Construction Co. of Beatrice, Neb., for building a line from Lincoln, Neb., to Nulford, 20 miles, to get rid of grades in the existing line.

CHICAGO, CINCINNATI & LOUISVILLE.—This company recently extended its road to Hammond, Ind., and is building an extension from that place to a connection with the Chicago Terminal Transfer Company's line, three miles.

CLEVELAND & SHARON TRACTION.—This company, which was recently incorporated with a capital of $2,500,000, recently completed its organization at Sharon, Pa., by electing the following officers: President, Francis B. Morgan, Cleveland, Ohio; Vice-President and Secretary, John Blake, Brooklyn, N. Y.; Treasurer, C. F. Clendenning, New York; Assistant Secretary and Treasurer, P. F. Morgan, Cleveland, Ohio. The company proposes to build a line from Middlefield, Ohio, to Sharon. At Middlefield connection is to be made with the Cleveland & Eastern, giving a direct line from Sharon, Pa., to Cleveland.

DENVER, ENID & GULF.—See Atchison, Topeka & Santa Fe.

ERIE.—This company, which is building a line from Highland Mills, N. Y., to Guymard, 42 miles, also one from Hunt to Cuba, N. Y., 33 miles, and another from Lakewood, N. Y., to Columbus, Pa., 23 miles, has given contracts for the work between Highland Mills and Guymard as follows: Newburgh Junction to Woodbury, Sundstrom & Stratton, New York; Woodbury to Moodna Creek, John F. Shields, Richmond Hill, Long Island; Moodna Creek viaduct, metal work is being done by company's forces. Masonry work, Smith-McCormick Co., Belfast, N. Y.; Moodna Creek to Otterkill, Ferguson Construction Company, New York City; Campbell Hall to Stony Ford, Lathrop, Shea & Henwood Co., Scranton, Pa.; Otter Kill to Campbell Hall, Lathrop, Shea & Henwood Co., Scranton, Pa.; Stony Ford to Mechanicstown, F. H. Clement & Co., Philadelphia, Pa.; Mechanicstown to Howells, F. H. Clement & Co., Philadelphia, Pa.

On work from Hunts to Cuba contracts have been let as fol-

lows: From Hunts to Rossburg, Millard Construction Co., Philadelphia, Pa.; Rossburg to Fillmore, to Caneadea, to Rockville; Rockville to Black Creek, W. H. Coverdale & Co., New York; Black Creek to Cuba, Bennett & Smith, Wilkinsburg, Pa.

On work from Lakewood, N. Y., to Columbus, Pa., contracts have been let as follows: From Lakewood to Grant, Burke Brothers, Scranton, Pa.; from Grant to Columbus, J. G. White & Co., New York.

Fourche River Valley & Indian Territory.—This company, which recently extended its road to Camp D, in Arkansas, has given contracts to Robert G. Jenkins, of Fourche, for a further extension from that point to the west line of Perry County, 38 miles.

Georgia Roads (Electric).—The Macon & Albany Securities Co. has been organized in Georgia to build electric lines to connect Macon, Americus and Albany and to run in connection with the interurban road from Atlanta to Macon, surveys for which have been made. N. J. Cruger is President, J. S. Davis Vice-President and W. J. Massee, Secretary and Treasurer.

Illinois Central.—Contracts have been given by this company to Smith & Scott and the Talley-Bates Construction Co., of Memphis, Tenn.; also to the L. E. Myers Co., and the Lorimer & Gallagher Co., of Chicago, for work from Corinth, Miss., to Haleyville, Ala., 80.23 miles; and from Atoka to Kerrville, 5.50 miles, a total of 85.73 miles.

Indianapolis & Louisville.—This company, which has completed 18 miles of its road between Wallace Junction, Ind., and Victoria, has given contracts to Dickason Construction Co. for building the remainder of the line between these places, about 29 miles.

Manila & Southwestern.—This company, which recently completed five miles of its road to Lunsford, Ark., is building with its own force an additional 12½ miles from that place to Hancock, and is making surveys from the latter place to Manila, 6½ miles further.

Minneapolis & St. Louis.—Contracts have been given by this company for extending the Minnesota, Dakota & Pacific from Chelsea, S. Dak., the present terminus, to Le Beau, 83.42 miles. Winston Bros. & Co. are the contractors.

Missouri Pacific.—This company has given contracts for extending its lines as follows: On the Gurdon & Fort Smith from a point near Caddo Gap, Ark., to a point near Black Springs, 9.62 miles, to the Dalhoff Construction Company, Little Rock, Ark.; Wabash Southern from five miles northeast of Zeigler, Ill., to Benton, 4.37 miles, to the J. A. Ware Construction Co., of St. Louis, Mo.; Marion & Johnston City from Marion, Ill., to Johnston City, 9.44 miles, to T. E. Newell, of Marion, Ill.; and on the Springfield Southwestern from Crane, Mo., to Springfield, 34.36 miles, to the Willier Construction Company, of Springfield, Mo.

Nevada-California-Oregon.—This line has been extended from Madeline, Cal., north nine miles, and surveys are being made to extend it to Alturas, a total of 40 miles.

New Castle & New Wilmington.—This company has been granted a charter in Pennsylvania to build a line 10 miles long in Lawrence County. The company is capitalized at $60,000, and the officers are: President, J. H. Veazey; Directors, J. H. Veazey, J. J. Ashenhurst, C. E. Trainor, Charles Freeman, G. N. Nealy, H. M. Kirk and W. B. Clendenin.

New Orleans Great Northern.—This company, which has extended a section of its road north as far as May's Creek, Miss., has given contracts to W. J. Oliver, of Knoxville, Tenn.; Smith & Scott, Memphis, Tenn.; the Worthington Construction Co., of Alabama; E. W. Hanlon, of New Orleans, La., and to Shea & Ford, Buffalo, N. Y., for building various sections of its line as follows: May's Creek, Miss., to Jackson, 84 miles; Lawrence Creek, La., to Tylertown, Miss., 23 miles, and from Slidell, La., via Mandeville to Abita Springs, 26 miles.

New York, New Haven & Hartford.—This company, under the name of the Providence Terminal Company, is building a line from Providence, R. I., to East Providence, 2.70 miles. This includes the tunnel under the city.

Pacific & Idaho Northern.—Surveys are being made by this company for an extension of its road from Evergreen, Idaho, to which point it has recently been extended, to Meadows, 16 miles.

Pacific Railway & Navigation Company.—This company is building an extension of its road, recently completed to Twenty-Mile post, from that point to Tillanook, Oregon, 68 miles; also from Twenty-Mile post to Venonia, an additional 13½ miles. Surveys are also being made for a further extension from Astoria to Newport.

Payette Valley.—An extension of this road is to be built from its present southern terminus at New Plymouth, Idaho, to a point near Emmett, 15 miles.

Peoria, Bloomington & Champaign (Electric).—This company has filed a mortgage to secure an issue of $3,000,000 worth of 30 year, 5 per cent. bonds, to be due in 1936, with the Central Trust Company of Chicago. By the terms of the instrument, $2,000,000 is to be available at once and $1,000,000 is held in reserve for construction and extensions. These sums are to be used in the building and maintaining of the McKinley line between Peoria, Ill., and Bloomington.

Providence Terminal Company.—See New York, New Haven & Hartford.

Rio Grande Western.—This company is building an extension of its road from Revere, Utah, to Bingham Mines, 15 miles.

Southern Pacific.—The Beaverton & Willsburg, which was recently organized to build an auxiliary line for this company in Oregon, is to connect the west side, Yamhill and east side divisions of this company by a line to be built from Beaverton to Willsburg, 13½ miles long, crossing to be made over the Willamette river by a high bridge. (Nov. 30, p. 152.)

Vallejo & Northern (Electric).—An officer writes that this California company, which was recently incorporated with $2,500,000 capital, is now making location surveys, and securing the necessary rights of way; and it expects to let contracts early next spring for the work. The proposed route is from Vallejo northeast via Fairfield, Vacaville and Winters to Woodland, with a number of branches, a total of about 70 miles. The office of the company is at 327 Georgia street, Vallejo, Cal. The work will be heavy in the mountain pass, but the balance will have light grades and easy curves. Melville Dozier, Jr., 649 Mariposa street, Oakland, Cal., is President and Chief Engineer. (Nov. 30, p. 153.)

Woodlawn Street Railway (Electric).—Application has been made in Pennsylvania for a charter for this company by J. F. Reed, of Beaver. The company proposes to build a line from the Pittsburgh & Lake Erie station at Beaver to New Sheffield, about six miles. The general offices of the company will be at Aliquippa. The incorporators include D. G. Dugan, S. J. Dugan, James A. Newell, J. E. Wilson and R. Burgher.

Yazoo & Mississippi Valley (Ill. Cent.).—Contracts have been given by this company to N. J. Roach & Co. and P. H. Rogers, of Memphis, Tenn., and to J. D. Lynch, of Monmouth, Ill., for work from Holly Bluff, Miss., to Kelso, 13.3 miles; Etter, Tenn., to Lake View, Miss., 6.7 miles; Leland, Miss., southwest 10.8 miles, and Philipp, Miss., to Charleston, 27.6 miles; a total of 58.4 miles.

RAILROAD CORPORATION NEWS.

Chicago, Peoria & St. Louis.—The July 1 interest on the 5 per cent. consolidated mortgage 30-year bonds of this company was paid on December 18. (July 13, p. 12.)

Connecticut Railway & Lighting Co.—See Consolidated Railway.

Consolidated Railway (N. Y., N. H. & H. Electric Lines).—This company has agreed to buy the Connecticut Railway & Lighting Co., which is a consolidation of a dozen street railways operating 198 miles of road in and between towns in the southwestern part of Connecticut. It is understood that the property has been leased to the New York, New Haven & Hartford. (Nov. 9, p. 130.)

Delaware Railroad.—A semi-annual dividend of 4 per cent. on the $2,987,225 stock has been declared. The annual rate has been 6 per cent. since 1898. The road is controlled by and leased to the Philadelphia, Baltimore & Washington.

New York, New Haven & Hartford.—This company has bought the $12,000,000 outstanding stock and $6,881,000 outstanding bonds of the Rhode Island Securities Company, exchanging for these securities 4 per cent. debentures of a subsidiary, the Providence Securities Company. The Rhode Island Securities Company controls the street railways, gas and electric light properties in and near Providence, R. I. See Consolidated Railway.

Philadelphia, Baltimore & Washington.—See Delaware R. R.

Providence Securities Company.—See New York, New Haven & Hartford.

Rhode Island Securities Company.—See New York, New Haven & Hartford.

Wabash.—At a special meeting of the Board of Directors on December 22, the plan for retiring the $3,500,000 6 per cent. non-cumulative debenture "A" bonds, and the $26,500,000 debenture "B" bonds was approved. Each $1,000 "A" bond is to be exchanged for $775 new 4 per cent. mortgage bonds, $560 par value preferred stock and $560 par value common stock. Each $1,000 "B" bond is to be exchanged for $700 new bonds, $500 par value preferred stock and $500 common stock. (Oct. 26, p. 116.)